

GUIDE TO FREQUENCY PLANNING

ACP190 (A)



APRIL 1996

FOREWORD

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**THE COMBINED COMMUNICATION-ELECTRONICS BOARD
LETTER OF PROMULGATION
FOR ACP190 (A)**

1. The purpose of this Combined Communication Electronics Board (CCEB) Letter of Promulgation is to implement ACP190 (A) within the Armed Forces of the CCEB Nations. ACP190 (A), GUIDE TO FREQUENCY PLANNING, is an UNCLASSIFIED publication developed for Allied use and, under the direction of the CCEB Principals. It is promulgated for guidance, information, and use by the Armed Forces and other users of military communications facilities.
2. ACP190 (A) is effective on receipt for CCEB Nations and when by the NATO Military Committee (NAMILCOM) for NATO nations and Strategic Commands.

EFFECTIVE STATUS

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3. All proposed amendments to the publication are to be forwarded to the national co-ordinating authorities of the CCEB or NAMILCOM.

For the CCEB Principals

N. CRAM
Squadron Leader
Permanent Secretary to CCEB

RECORD OF MESSAGE CORRECTIONS

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CHAPTER 1

INTRODUCTION

- 101. Purpose.** The purpose of this publication is to provide guidance to Force Commanders on the organization required and the responsibilities of staff engaged on frequency management tasks.
- 102. Scope.** This publication is intended to fill the need at theater and unit level for a reference document concerning frequency management, allocation and assignment. Frequency coordination between nations should in the first instance be carried out by national frequency staff.
- 103. Expression of Year.** Beginning on 1 January 2006, the date time group of a message will contain a four digit year, i.e. 011500Z JAN 2006. Within the body of the message, the established standards for character based messaging will be followed, e.g. The United States message text format (USMTFS), Allied Data Publication (ADATP-3), Australian Defence formatted message standard (ADFORMS). These standards have adopted a four digit year for date data transmission.

CHAPTER 2

FREQUENCY ASSIGNMENT PRINCIPLES

201. General. Frequency planning is performed to meet the needs of, and would normally be developed in association with, a communications plan. Effective frequency planning cannot be conducted in the absence of a communications plan. For large deployments the development of a frequency plan can be complex and time consuming and therefore should commence as soon as preparation of the preliminary communications plan has commenced.

202. Frequency Reuse. For large deployments it may not be possible to assign frequencies uniquely to each CE application since the requirements for frequency assignments are likely to exceed the spectrum available. As a consequence, the frequency plan must provide for sharing of individual frequency assignments between a number of different CE applications. Normally frequency sharing between two different applications would result in mutual harmful interference, however such interference can be reduced by:

- a. Timesharing the same frequency on a predetermined schedule which, in military operations, is sometimes acceptable and, in the case of HF, can be used to exploit the daily changes in ionospheric propagation conditions for long range communications.
- b. Reusing the same frequency with geographic separation, so that potentially interfering signals are significantly weaker than the wanted signals. This is almost always used by military frequency managers to make more productive use of the spectrum. The assessment of the possibility of reusing frequencies requires computation of relative signal strengths of the wanted and unwanted signals at the receiver. To ensure that frequency reuse can be achieved in the operational area the frequency manager may need to impose geographical constraints on the use of an assignment, limit the power that can be emitted by limiting antenna gain or transmitter power and, in some cases, limit the height of the antenna above ground level.
- c. **Propagation Calculations.** Knowledge of radio wave propagation is essential to both the creation of a successful communication plan and its associated frequency plan. In the case of the communication plan, propagation calculations are necessary to guide the choice of the most suitable communications techniques to use and the subsequent placement of radio and repeater sites. In the case of frequency plans, propagation calculations are necessary to ensure the required protection ratio is maintained when employing frequency sharing techniques and also to select an appropriate operating frequency for HF Communications.

204. To perform propagation calculations it is essential to have a knowledge of the:

- a. Power and antenna performance characteristics of the equipment in use.
- b. Terrain over which the signals are to be transmitted, and
- c. For HF skywave communication, the prevailing ionospheric conditions.

Terrain data may be provided by contour maps (1:50,000 scale is suitable) or a digital terrain data base giving a similar resolution. Ionospheric conditions may be estimated from soundings (either

oblique or vertical incidence) or by predictions from an ionospheric prediction service or a prediction model held by the frequency manager. It is recommended that a specialist section with expertise in radio wave propagation calculation be formed as part of the frequency allocation and assignment committee to support the work of that committee and other functions of the theater C-E Board.

205. Frequency Co-ordination. Arising from the need to effect frequency reuse is the need to co-ordinate frequencies with other users, both civil and military, within the area of operations and in adjacent or nearby areas. This co-ordination is normally conducted by established frequency management facilities (FMFs), either military or civil, having responsibilities for the area in which operations are being planned. When the original application for frequency allotments is made, this established frequency management facility (FMF) would respond by making allotments which are cleared for use in the area of operations. In some cases, to facilitate co-ordination restrictive caveats may be imposed on some of the allotted frequencies.

206. In cases in which there are no established FMFs in the area of operations, there will be no formal allotment of frequencies and frequency co-ordination will need to be carried out directly with adjacent military formations where practicable. Co-ordination with civil frequency users may be impractical. The following basic rules will assist the frequency manager in establishing a workable frequency plan:

- a. Develop, during preliminary reconnaissance, an appreciation of frequency usage in the area of operations by liaison with persons with local knowledge, direct observation and by use of any other intelligence that can be gained.
- b. Adhere to the provisions of the ITU or National Tables of frequency allocations when preparing the frequency plan. Whenever possible, separate the frequencies sub-allotted between tactical land mobile, tactical maritime and, particularly, tactical air applications since neither air nor maritime applications can readily adhere to the geographic constraints that could be applied to land tactical applications.
- c. For land forces with a static front, assign odd numbered frequencies to units operating on the left and even numbered frequencies to units operating on the right of a Division or Corps area.
- d. Avoid sharing tactical mobile frequencies with those used for rear link and other fixed communications.

Despite these precautions an increased incidence or harmful interference can be expected and the frequency manager must be ready to respond quickly with alternative assignments upon receipt of interference reports. Retention of a small reserve of frequencies will facilitate a swift response to this and other exigencies. The existence and nature of interference must be recorded to enable a pattern of use of the spectrum to be assembled by experience.

207. Frequency Management Organizations With a Large or Multi-National Force. For very large or multi-national deployments it may be appropriate for significant elements of the force to operate their own FMFs. The FMFs supporting elements of the force would operate in a subordinate role to the force HQ FMF. In these cases, subordinate FMFs would consolidate the frequency needs of the elements of the force they serve and seek a bulk allotment of frequencies to meet those needs from the force FMF. The force FMF would make a bulk allotment of frequencies to the subordinate

FMFs specifying constraints on use which would permit the greatest possible degree of frequency sharing with other elements of the force. The subordinate FMFs would make discrete assignments from the bulk allotment and, desirably, advise the force FMF of the details of the assignments they have made. This would particularly apply to HF and other assignments capable of causing interference to adjacent forces and will enable the force FMF to make accurate judgements about subsequent revisions of the frequency plan necessitated by a changing tactical situation. Where co-ordination with other agencies is necessary, the subordinate FMF should affect such co-ordination through the force FMF.

208. Responding to Co-ordination Requests. Prompt responses to frequency co-ordination requests, received from adjacent forces, is essential if military operations are not to be impeded. Some interference risks must be accepted if an adequate spectrum sharing is to be achieved. The judgement of whether an assignment can be co-ordinated depends on the probability and degree of interference and also on the relative importance of the circuit supported by the assignment at risk. If co-ordination cannot be effected the reason for the objection should always be given together with alternative suggestions whenever practical.

209. Theater Frequency Records. The importance of maintaining an accurate record of frequency assignments and allotments within a theater of operations cannot be over emphasized. A theater frequency list is best maintained with the aid of computer equipment permitting the ready manipulation of the mass of data that will accumulate and also very swift record retrieval. In the absence of computer support significant delays in frequency management action may occur and the adoption of fast retrieval easily modified record system such as a card index system should be considered. Theater frequency records facilitate responsive frequency planning and can readily demonstrate the possibilities of frequency use in the theater of operations. During a prolonged operation it is important to faithfully record the cancellation or variation of the terms of frequency assignments as they occur. Failure to adhere to this discipline will result in the progressive degradation of frequency records.

CHAPTER 3

THEATER OF OPERATIONS FREQUENCY CONTROL

- 301. General.** The Theater Commander exercises centralized control of radiating electronic devices operated by all the forces under his command. Frequency control in an allied theater of operations is outlined in this chapter.
- 302. Theater Director of Communications-Electronic.** Normally the Theater Commander will appoint an officer as Director of Communications-Electronics (C-E). The Theater Director C-E will determine the policies governing the use by military forces of the radio frequency spectrum and will establish an organization to implement these policies. In the development of the theater frequency control organization, provision must be made to incorporate the requirements of all allied military forces which are operating within the theater of operations.
- 303. Theater Communications-Electronics Board.** The Theater Director of C-E will normally establish a Theater C-E Board to co-ordinate C-E within the theater and with adjacent allied forces. The members of this board will advise the Theater Director of C-E in matters pertaining to their particular services. While there is no prescribed structure for this board, two possible methods of its organization are shown in Figures 3-1 and 3-2. The choice of which type of board to organize would be dependent on the tactical employment of the forces within the theater of operations. If all the forces (ground, air and naval) of each nation represented are under a single national command, the organization of Figure 3-1 is advisable. On the other hand, if all the forces of each individual service are under a single command, the organization shown in Figure 3-2 is more appropriate. The Board will normally form committees to perform detailed work, the number and functions of which would depend on the size of the theater of operations and the composition of the forces.
- 304. Frequency Allocation and Assignment Committee.** The Frequency Allocation and Assignment Committee is established under the Theater C-E Board and is the working agency which normally acts for the theater commander in frequency matters. Within the limits imposed by higher authority, and subject to co-ordination with other theaters, the commander of an active theater has authority to assign frequencies for use within his theater of operations.
- 305. Frequency Co-ordinating Groups.** In some theaters of operation it may be desirable to establish frequency co-ordinating groups. The mission of these groups will be to assist the subordinate commander executing the frequency plan.
- 306. Theater Frequency Records.** The basic theater frequency records are prepared and maintained by the Frequency Allocation and Assignment Committee.

These records should include:

- a. frequency allocations within the theater.
- b. frequency assignments within the theater.

- c. assignments in other theaters which may affect operations.
- d. frequencies retained by civil authority and therefore not subject to control by the Theater Commander.

Assignment records should normally include authorized power, types of emission, types of operation and any special conditions.

ORGANIZATION OF THE THEATER C-E BOARD
NATIONALLY ORGANIZED

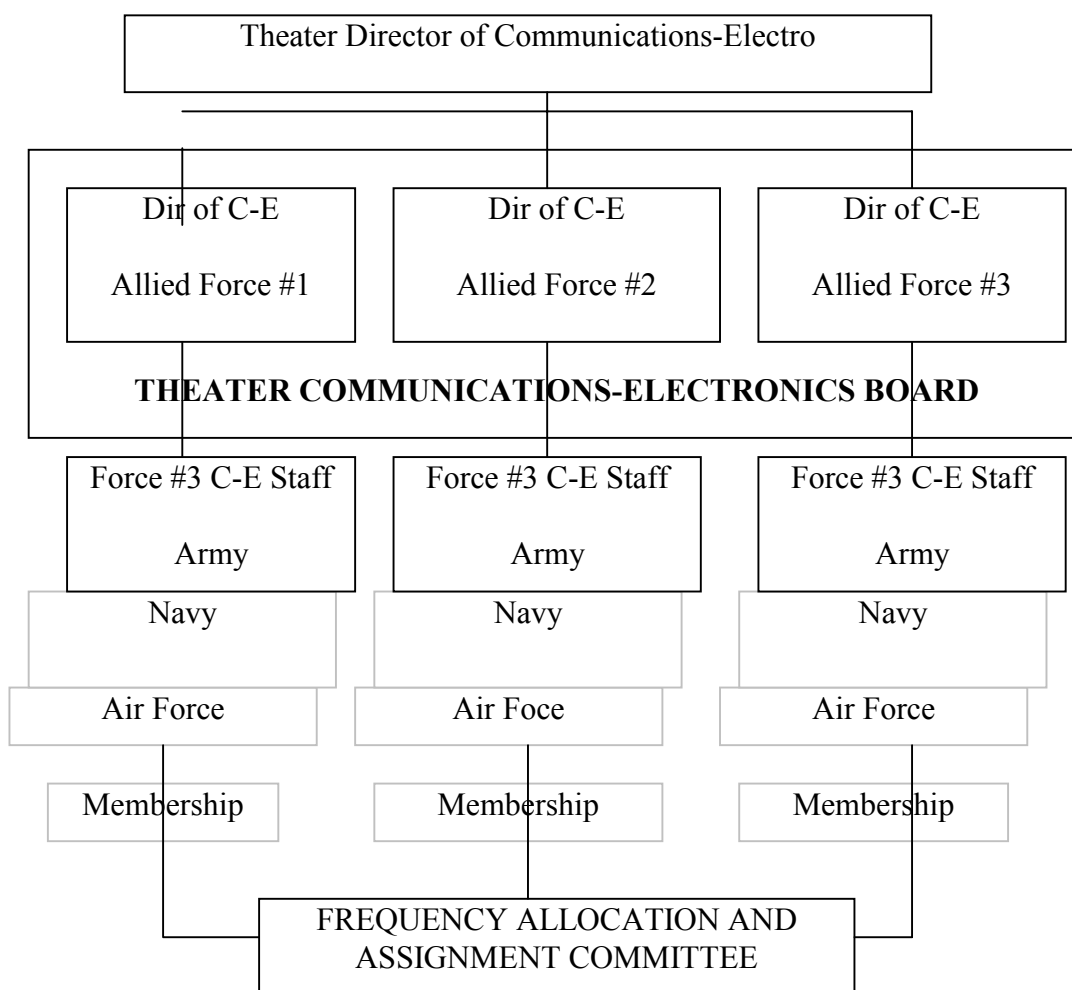


Figure 3-1

ORGANIZATION OF THE THEATER C-E BOARD
SERVICE ORGANISED

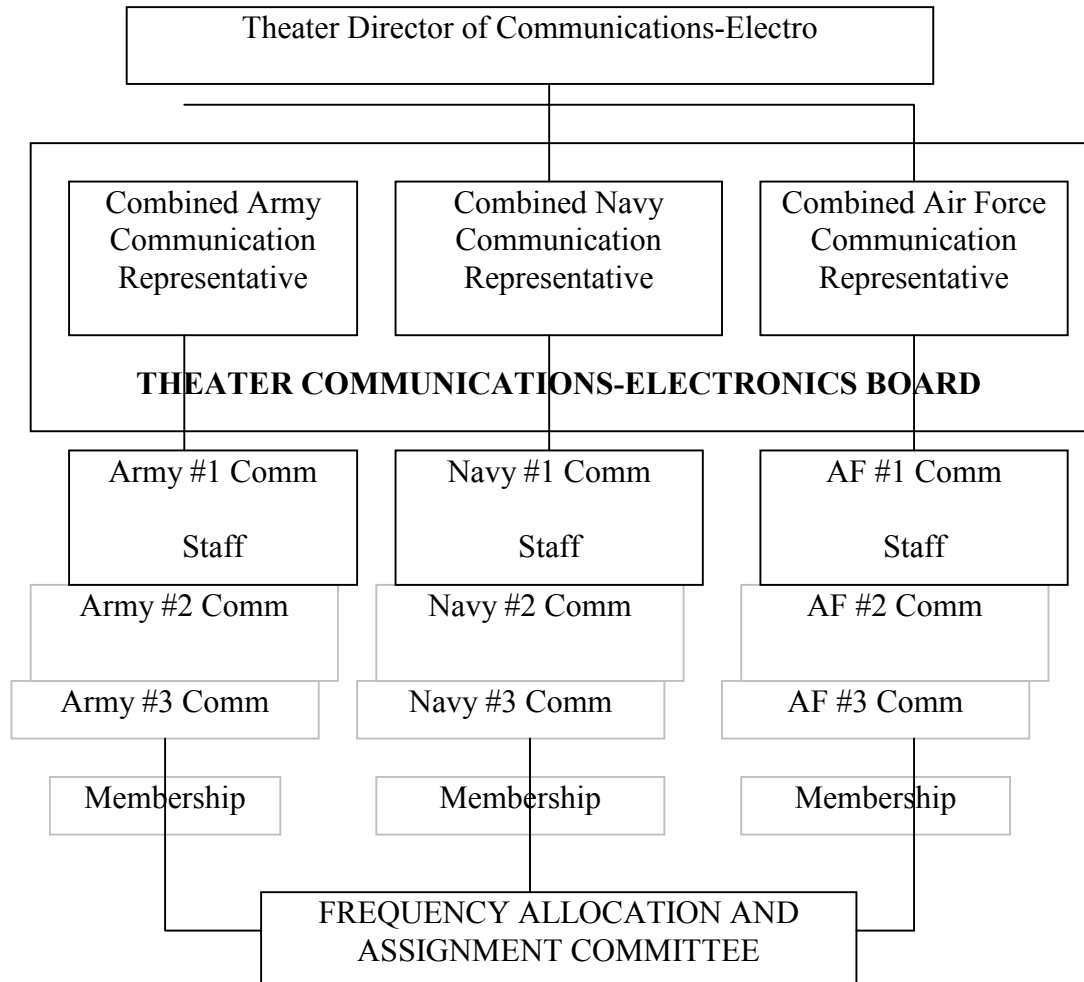


Figure 3-2

CHAPTER 4

FREQUENCY CONTROL AMONG ALLIED FORCES NOT IN A THEATER OF OPERATIONS

401. General. Occasions may arise where allied forces must operate together in the absence of a theater organization. The vital importance of centralized control of radiation on frequencies assigned to the military forces will require the same attention as in the theater of operations. This chapter is intended to serve as a guide to the C-E officers concerned.

402. Relationship of Forces. The command relationship of the forces concerned will determine the responsibility for, and method of exercising control over the use of frequencies. In the absence of a theater organization allied forces may expect to cooperate under one of the following sets of circumstances:

- a. Under Command. An element of one nation's forces is placed at the disposal of another commander and is subject to his orders for tactical operations.
- b. Under the same Commander. Elements of two or more nations forces are placed at the disposal of a commander of another nation and are subject to his orders for tactical operations.
- c. No Command Relationship. The allied forces involved are independent but capable of causing mutual harmful interference from radiating electronic devices.

403. Principles for Planning of Frequency Co-ordination. Responsibility for control of the use of frequencies assigned to military forces lies with the Commanders of the forces. To be effective, control must be exercised at the highest echelon of command. In circumstances where a command or liaison relationship does not exist between allied forces it is the responsibility of commander to establish contacts to enable co-ordination in the use of frequencies to be effected.

404. Methods of Control. The commander of a force will normally assign to his senior C-E officer the responsibility for creation and implementation of policy and detailed plans concerning use of frequencies. The senior commander of allied forces may establish a Force C-E Board to co-ordinate C-E matters within his force and with adjacent forces. The functions, organization, and methods of operation of the Force C-E Board will be similar to those of the Theater C-E Board described in paragraph 203, but adjusted to the particular needs of the force. Alternatively, the senior commander may exercise his responsibility for the control of assigned frequencies through his own C-E staff. In either case, however, the greatest care must be taken to ensure that the needs of all military forces concerned are incorporated in policy and plan.

405. Application. When a defined chain of command is established the senior commander is responsible for the effective utilization of frequencies assigned to elements of his force. Thus when allied forces are operating "under command" as in paragraph 302a, above, or "under the same commander" as in paragraph 302b, the responsibility is clearly that of the senior commander. However, when the allied forces capable of causing mutual harmful interference are operating with no command relationship the senior commanders must still arrange for co-ordination in the use of the frequency spectrum. Two possible situations may arise:

- a. Effective C-E Organisation Exists. If an effective C-E organisation is functioning in the area, senior commanders must ensure that it is kept fully informed of their needs for frequencies and that its plans and assignments are carefully followed. The initial approach may have to be made through diplomatic channels, but senior commanders should aim to establish direct liaison between the C-E organization and their own C-E staffs.
- b. No Effective C-E Organization. When no effective C-E organization is available to control use of military frequencies the senior commanders of independent allied forces must establish liaison between their C-E staffs. By mutual exchange of information the C-E staffs will identify interference problems and endeavour to eliminate them.

406. Responsibilities of C-E Staff Officers. Although ultimate responsibility for a force's efficient employment of assigned radio frequencies rests with the commander, in practice the C-E officer will be assigned to this task. C-E staff officers at all echelons of command must assist by:

- a. maintaining up-to-date lists of all assignments under their control;
- b. ensuring that no deviation from the frequency plan occurs;
- c. ensuring that new requirements for frequency assignments are made known to senior echelons at the earliest possible time so that adjustments to the overall plan may be worked out;
- d. promptly releasing assigned frequencies when no longer needed;
- e. maintaining close liaison with C-E officers both of higher and lower echelons and of flanking forces.

407. Summary. Regardless of the command structure, senior commanders of allied forces are responsible for ensuring that assigned radio frequencies are used to best advantage. Centralized control at the highest echelon is essential to achieve this. C-E staff officers must work in concert toward this objective.

CHAPTER 5

INTERFERENCE

501. General. A basic problem in frequency assignment is the establishment of geographical, operational and technical limitations on the use of frequencies to enable the required number of users to operate without experiencing interference. In making frequency assignments, full consideration must be given to the technical capabilities and limitations of equipment. Within congested portions of the spectrum some interference is to be expected and providing it does not become harmful (See paragraph 402), should be tolerated. Assignment of replacement frequencies should be considered only when other efforts to alleviate interference are ineffective.

502. Harmful Interference. Harmful interference as formally defined by the ITU is listed in Annex A. In a military operational environment it is seldom possible to invoke international regulations to protect frequency assets, except perhaps long-standing peacetime assignments. Therefore in the military context harmful interference is defined as any emission, radiation or induction which degrades, obstructs or repeatedly interrupts military telecommunications systems to the extent that operational effectiveness is seriously impaired.

503. The terms Permissible Interference and Accepted Interference are gaining acceptance for international frequency co-ordination (particularly space systems). It is possible to precisely quantify both these terms using the parameters, relative signal strength of the wanted and unwanted signal, and the probability of both signals being received simultaneously. The ITU definitions for these terms are listed in Annex A, but because there are no generally accepted quantified definitions, these terms should be used with caution in official correspondence.

504. Elimination of Harmful Interference. When harmful interference occurs, action should be taken in the following order:

- a. If possible, determine the source.
- b. If the source is local, endeavour to reduce the interference or eliminate by direct action.
- c. If local action is impractical, or unsuccessful, report the circumstances to higher authority, in accordance with instructions issued by the theater commander.

505. Interference Reports. Interference reports, both from the local user to higher authority, and from the committee in the affected area in direct contact with the committee in the area where the interference is believed to originate, should always take the format in Annex B.

CHAPTER 6

TO OBTAIN A FREQUENCY ALLOTMENT FOR USE BY A JOINT OR COMBINED FORCE

601. General. When a joint combined force is being formed, the force frequency manager will need an allotment of frequencies sufficient to support the proposed operation for each phase of the Theater Plan. As a preliminary step it will be necessary to assemble the frequency requirements of all units and formations of the force both in-theater operators and for ex-theater circuits including those being provided for purely national purposes such as rear links to capitals. Following the assembly of requirements it will be necessary to present them as a bulk bid to the Host Nation. If a Host Nation cannot be identified then advice should be taken from his own national authorities. The Host Nation should then provide lists of frequencies or of frequency bands together with such constraints as the Host Nation may wish to impose on the use of particular frequencies or bands of frequencies.

602. Assembly of Frequency Requirements. To facilitate compilation of the Force Frequency requirement, units and formations of the Force should provide lists of their frequency requirements to the Force Frequency manager for their respective nets, circuits, C-E equipment and systems. These lists are to include specific detail relating to frequency band, power, type of emission, necessary bandwidth etc. The format at Annex C which provides for these essential details should be used. Details on how to determine emission designators and necessary bandwidths are also given in Annex C.

603. Unit and formation commanders are to include and identify separately their own national ex-theater circuit requirements. They should also identify any circuits which are required only during the build-up phase so that frequencies allocated to these circuits may be used as a theater reserve or be returned to the Host Nation on completion of the build-up phase.

604. Presentation of Frequency Requirements. The force frequency manager should consolidate the frequency requirements for each phase of the theater plan and forward these to the Host Nation. This submission needs to be laid out so that the Host Nation Frequency Authority can easily decide whether his response should be in terms of individual frequencies or bands of frequencies, and at the same time can identify any constraints that will have to be imposed. The format to be used for his submission of the force requirement is outlined at Annex D.

605. Allotments of Frequencies. The Host nation Frequency Authority normally will not attempt to assign frequencies for in-theater operations. He may however wish to assign frequencies to out of theater circuits particularly if there is a requirement to coordinate distant ends of links. He should ensure that when the allotment is forwarded to the Force frequency manager it includes guidance in the form of geographical, bandwidth, emission and power constraints concerning the use of any frequencies. Should the Host Nation make any assignments, this would appear as a constraint on the use of that particular frequency.

606. Sub-Allotment of Frequencies. On receipt of the allotment and the list of constraints from the Host Nation the Force Frequency Manager should make a sub-allotment to the Battlefield Management System (BFSM) if one has been deployed for force and to any other components not served by the BFSM. Should a BFSM not have been deployed, the force frequency manager will

make a sub-allotment to each of the components/elements of the force (Navy, Army, Air Force, Marine) using the guidance for sub-allotting frequencies at Chapter 7

CHAPTER 7

GUIDANCE ON SUB-ALLOTING FREQUENCIES WITHIN A JOINT OR COMBINED FORCE

701. General. When a joint combined force is being assembled the 3 elements sea, land and air each arrive with their own procedures and experience built up during training under the restrictions imposed by the ITU Radio Regulations. Therefore, there is considerable advantage in continuing to use such procedures at least until the combined force has settled down and the patterns of frequency usage have stabilized. When the stable situation has been reached the frequency manager should be able to introduce variations in the initial sub-allotment. During the initial stages of a joint operation the following guidelines for sub-allotting frequencies below 3000 MHz should be followed.

NOTE: Armies. The ABCA Armies have produced a set of QSTAGs detailing frequency management within the armies of the ABCA alliance.

702. Below 1.5 MHz

- a. The ITU international allocation tables provide a useful guide for those Maritime and Navigation systems which play a global strategic role.
- b. There may be some requirements for transportable Aeronautical Radio-Navigation beacons operating above 300 kHz for both Maritime and Aeronautical use:

703. 1.5-30 MHz. In these bands there is a requirement for a complement of frequencies to be provided for use in day time and night time with further regard to range and period of the sunspot cycle. The international allocation tables have been drawn up with these conditions under consideration, and the initial sub-allotment of frequencies should be made as follows:

- | | | | |
|----|---|---|---|
| a. | Naval Force and Associated
Air Element | - | From the Maritime
Mobile Exclusive Bands |
| b. | Land Force | - | From the Fixed and
Land Mobile Bands |
| c. | Air Force | - | From the Aeronautical
Mobile (OR) Bands |
| d. | Land, Naval and Air Forces | - | From the Mobile Bands |

704. 30-108 MHz. This band provides support for single channel combat net radio systems and a number of small multi-channel systems. In addition some civilian types of management radios used on airfields and in specialist units may need support. Such civil radio systems suffer from a limited tuning capability but their working range is short. The force frequency manager should determine if any of the elements comprising the force have VHF combat net radios capable of tuning below 30 MHz. A portion of the spectrum below 30 MHz may become available if sunspot activity prevents its use in the normal HF skywave mode.

- a. 30-88 MHz. Combat Net Radios - mostly Land Force and Supporting Helicopters.
- b. 88-108 MHz. Multichannel Systems.
- c. 0-88 MHz. Civil type management radios - Land and Air Forces.

705. 108-174 MHz. This band still provides support for some military aeronautical systems and single channel maritime systems particularly for harbour control and short-range communication with merchant vessels.

- a. 105-156 MHz - Air and Naval Forces
- b. 156-175 MHz - Air and Naval Forces.

706. 225-400 MHz. This band supports military systems, naval and air force single channel systems and multichannel radio relay systems. Having satisfied the following requirements, the remaining spectrum is available for air-ground-air and other assignments.

- a. Satellite Uplinks - Assignment Exclusive

292.925-317.350 MHz

- b. Land Force Radio Relay

225.00-230.00 MHz, 235.25-240.35 MHz
270.25-275.25 MHz, 285.25-290.25 MHz
301.25-306.25 MHz, 318.25-328.25 MHz
347.75-355.25 MHz, 387.25-394.75 MHz

- c. Naval Single Channel Systems

To be provided if and when required.

- d. Land Force - Aviation

249.0, 249.9, 250.9, 251.9, 252.9, 253.9, 255.9, 256.9, 257.3 MHz

- e. Airborne Early Warning Channels

To be provided if and when required.

- f. Sonobuoy Command Frequencies

282.9, 291.3, 291.4 and 291.5 MHz

- g. Frequencies between 328.6 and 335.4 MHz have been internationally allocated to Civil Instrument Landing Systems in use at most major airports. Such frequencies may only be used by the force in a war situation and then only when strictly necessary.

707. 400-960 MHz. This band is used to support mainly naval radars and radio relay multichannel systems.

- a. Naval Radars
 - 420-450 MHz
 - 890-942 MHz
- b. Multichannel Radio Relay Systems - 610-960 MHz

708. Above 960 MHz. It is recognised that a considerable number of military C-E systems operate in frequency bands above 960 MHz, eg:

- a. Satellite and radio relay communications.
- b. Many radars (radiolocation and radionavigation), used by land, naval and air forces.
- c. Specialized air-ground-air command and data communications system.

Frequency assignments for these C-E systems will be made on a case-by-case basis since frequency support for such systems is not expected to present significant problems.

TERMS AND DEFINITIONS

1. **General.** The following definitions, which are approved for frequency management matters, are extracted from ITU radio regulations and are listed here for convenience. Users should be aware that these definitions may differ from those contained in ACP 167.

2. **Specific Frequency Management Terms**

a. **Allocation:** (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radio communication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned.

b. **Allotment:** (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radio communications service in one or more identified countries or geographical areas and under specified conditions.

c. **Assignment:** (of a radio frequency or radio frequency channel): Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

3. **Operational Terms**

a. **Frequency Shift Telegraphy:** Telegraphy by frequency modulation in which the telegraph signal shifts the carrier frequency between predefined values.

b. **Telegraphy.** A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be sorted for subsequent use.

c. **Telephony:** A form of telecommunication primarily intended for the exchange of information in the form of speech.

4. **Emission Characteristics**

a. **Assigned Frequency Band:** The frequency band within which the emission of a station is authorized; the width of the band equals then necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface.

b. **Assigned Frequency.** The center of the frequency band assigned to a station.

c. **Reference Frequency.** A frequency having a fixed and specified position with respect to the assigned frequency. The displacement of this frequency with respect to the assigned frequency has the same absolute value and sign that the displacement of the characteristic frequency has with respect to the center of the frequency band occupied by the emission.

NOTE: A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of fixed image.

- d. Frequency Tolerance. The maximum permissible departure by the center frequency band occupied by an emission from the assigned frequency or, by the characteristic frequency of an emission from the reference frequency.

The frequency tolerance is expressed in parts in 10^6 or in Hertz.

- e. Necessary Bandwidth. For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.
- f. Occupied Bandwidth. The width of a frequency band such that, below the lower and above the upper frequency limits; the mean powers emitted are each equal to a specified percentage $b/2$ of the total mean power of a give emission. Unless otherwise specified for the appropriate class of emission, the value of $B/2$ should be taken as 0.5 per cent.
- g. Right-Hand (Clockwise) Polarized Wave. An elliptically or circularly-polarized wave, in which the electric, field vector, observed in any fixed plane, normally to the direction of propagation, rotates with time in a right-hand or clockwise direction.
- h. Left-Hand (Anticlockwise) Polarized Wave. An elliptically or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction.
- i. Peak Envelope Power (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.
- j. Mean Power: (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.
- k. Carrier Power: (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.
- l. Gain of an Antenna. The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization.

Depending on the choice of the reference antenna a distinction is made between:

- (1) absolute or isotropic gain (G), when the reference antenna is an isotropic antenna isolated in space;
 - (2) gain relative to a half-wave dipole (Gd), when the reference antenna is half-wave dipole isolated in space whose equatorial plane contains the given direction;
 - (3) gain relative to a short vertical antenna (Gv), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction.
- m. Equivalent Isotopically Radiated Power (e.i.r.p.): The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).
- n. Effective Radiated Power (e.r.p.) (in a given direction): The product of the power supplied to the antenna and its gain relative to a half-wave dipole in a given direction.
- o. Tropospheric Scatter: The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere.
- p. Out-Band Emission: Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions.
- q. Spurious Emissions: Emissions on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.

5. **Frequency Sharing**

- a. Interference. The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radio-communication system, manifested by and performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.
- b. Harmful Interference: Interference which endangers the functioning of a radio-navigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radio-communication service operating in accordance with these Regulations.
- c. Protection Ratio (R.F.): The minimum value of the wanted-to-unwanted signal ratio, usually expressed in decibels, at the receiver input, determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output.
- d. Co-ordination Area: The area associated with an earth station outside of which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level.

- e. Co-ordination Contour. The line enclosing the co-ordination area.
- f. Co-ordination Distance. Distance on a given azimuth from an earth station beyond which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level.

6. Space Terms

- a. Geosynchronous Satellite. An earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis.
- b. Geostationary Satellite: A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth.

**MEACONING, INTRUSION, JAMMING AND
INTERFERENCE REPORT ELECTRICAL TRANSMISSION FORMAT**

1. Receiving station experiencing MIJI:
 - a. Aircraft Report:
 - (1) type, tail number, callsign,
 - (2) Type emission (strike, recon, training) and nicknames, if any,
 - (3) departure point and destination
 - (4) true course, ground speed, and mean sea level altitude,
 - (5) parent organization;
 - b. Ground Site Report:
 - (6) victim designation and call sign,
 - (7) victim function (surveillance, ground-controlled intercept (GCI), communications, etc),
 - (8) parent organization (when applicable);
 - c. Ship Report:
 - (9) type, callsign, number and name,
 - (10) route or operations area,
 - (11) true course and speed,
 - (12) type mission (training, patrol, etc);
 - d. Satellite Report:
 - (13) type, nickname, space defense object number, and inter-range operations number,
 - (14) orbit (apogee, perigee, inclination, and revolution number),
 - (15) name and co-ordinates of servicing ground station.
2. Type incident. Meaconing, intrusion, jamming or interference.
3. Operator or point of contact, function and AUTOVON number.

4. Weather conditions.
5. Nomenclature of equipment affected.
6. Were photos, drawings, or signal recordings made? if so, show to whom sent.

NOTE: On photos or drawings, include azimuth, heading, range mark values, and other orientation data, and identification or nomenclature of scope used to obtain photos or drawings. On tapes, show recording speed and approximate location of MIJI signal, annotate with operator's comments if possible.

7. Date, time (Z), and co-ordinates MIJI began.
8. Date, time (Z), and co-ordinates MIJI most effective.
9. Date, time (Z), and co-ordinates MIJI ended.
10. List any bearings to MIJI source with corresponding time (Z) and direction finder (DF) facility co-ordinates communications.
11. Transmitter being affected (call sign, frequency, bandwidth, type omission, or audio characteristics).
12. MIJI (interfering signal) (call sign, frequency, bandwidth, type emission, or audio characteristics).
13. Use or purpose of frequency affected.
14. MIJI effectiveness (percent of copy lost).
15. Other stations or units confirming MIJI.
16. How did MIJI begin or end (faded, abruptly, victim, or MIJI shifted frequency)?
17. Electronic counter-countermeasures (ECCM) use and results (alternate frequencies used successfully).

NAVAIDS

18. Identification and location of NAVAID affected.
19. Type of NAVAID, frequency; or channel.
20. MIJI call sign heard.
21. MIJI effects or characteristics.

22. Other NAVAIDS being monitored.

RADAR

23. Victim operating frequency.
24. MIJI signal bandwidth.
25. Sector width of main lobe jamming and azimuth of strongest intensity (use optimum gain).
26. Sector width of side or back lobe jamming and azimuth of strongest intensity. Report whether back or side lobe.
27. Type MIJI (continuous wave (CW), pulse, noise, etc).
28. MIJI effectiveness (percent degradation of target detection capability inside and outside the sector affected by MIJI).
29. Persistence of MIJI (steady, varied, on, off, explain).
30. Was MIJI present in standby mode, sector scan, with antenna stopped or after changing range modem?
31. Antenna tilt or elevation for maximum interference.
32. ECCM used and results.
33. Best ECCM mode.
34. If electronic support measures receivers available, results of frequency spectrum check. Attempt to relate MIJI signal to other activity (this is, check for synchronization, pulse recurrence frequency, scan with other signals on MIJI line of bearing).
35. MIJI effect of RWR: Billboards illumination, strobe (type, length, and bearing) audio?
36. **Chaff**
- a. rack length, width and altitude?
 - b. co-ordinates for start, stop, and turn points;
 - c. estimated rate of fall;
 - d. chaff and aircraft fade time?
 - e. type of drop (random, streak etc)?
 - f. wind direction and velocity?

g. were chaff samples obtained? If so, show to whom sent. If available, send according to item 6.

37. Electro-Optics (E-O)

- a. frequency or wavelength of victim equipment;
- b. bandwidth (bandpass) of victim equipment;
- c. frequency or wavelength of MIJI;
- d. bandwidth of MIJI;
- e. coherent or non-coherent radiation?
- f. collimated beam, specular, or diffuse?
- g. extent of E-O radiation in azimuth, and elevation at victim location?
- h. pulsed or CW radiation?
- i. modulation characteristics;
- j. type of E-O equipment affected;
- k. use of purpose of victim E-O equipment;
- l. effect of E-O MIJI on victim equipment;
- m. effectiveness of E-O MIJI;
- n. how did E-O MIJI start (abrupt, fade-in)?
- o. persistence of E-O MIJI (steady, on-off; explain)?
- p. how did E-O MIJI end (abrupt, fadeout)?
- q. if victim E-O equipment has an active E-O mode (that is, active source) is MIJI present in all modes (active, passive, standby)?
- r. were any E-O counter-countermeasures used? If so, with what results?
- s. presence of any concurrent audio, visual, or electromagnetic indications of E-O MIJI;
- t. were any non E-O equipment victim of MIJI activity concurrently and if so, report applicable data under proper item numbers;

- u. expand upon weather conditions (item 4) to include temperature, relative humidity, visibility (haze, fog smoke, clouds), precipitation.

SATELLITES

38. Victim data:

- a. uplink or downlink signal affected;
- b. frequency, signal strength, bandwidth, and modulation;
- c. receiver bandwidth and sensitivity;
- d. antenna size, type and gain;
- e. interfering signal:
 - (1) frequency, bandwidth, signal strength,
 - (2) bearing data (azimuth or elevation);
 - (3) description (type, duty factor, variations in signal strength, etc),
 - (4) effectiveness (percentage of degradation),
 - (5) suspected sources;
- f. identification of, location of, and bearing from other interception stations.

39. Narrative

- a. summarize the MIJI incident. Operator's explanation of just what happened.
- b. list ships, ground units, aircraft in vicinity that might be MIJI source. (Use only secure communications to discuss MIJI with other units);
- c. state mission phase at the time of incident (routine operations, in combat, flying to target, etc); and
- d. include the term "final report" if additional reporting is not anticipated.

NOTE 1: Essential elements for all initial reports in brevity format will be based on items 1 to 18 as listed.

NOTE 2: All applicable items concerning an interference report will be transmitted in follow-up reports through ITU/ARFA channels, and this format will not preclude the use of other related formats as circulated by ITU/ARFA.

DESIGNATION OF EMISSIONS

1. Frequency Nomenclature

- a. The radio spectrum is sub-divided into nine frequency bands, which are designated by progressive whole numbers in accordance with Table C-1 below.
- b. Frequencies are expressed in:

kilohertz (kHz), up to and including 3000 kHz;
 Megahertz (MHz), above 3 MHz, up to and including 3000 MHz;
 Gigahertz (GHz), above 3 GHz, up to and including 3000 GHz.
- c. For bands above 3000 GHz, i.e. centimillimetric waves, micrometric waves and decimicrometric waves, it would be appropriate to use Terahertz (THz).
- d. Where adherence to these provisions would introduce serious difficulties, reasonable departures may be made.

Frequency Band Nomenclature

Band Number	Symbols	Frequency Range (lower Limit exclusive, upper limit Inclusive)	Corresponding Metric Sub-divisions
4	VLF	3 to 30 kHz	
5	LF	30 to 300 kHz	Long Waves
6	MF	300 to 3000 kHz	Medium Waves
7	HF	3 to 30 MHz	Short Waves
8	VHF	30 to 300 MHz	
9	UHF	300 to 3000 MHz	
10	SHF	3 to 30 GHz	Microwaves
11	EHF	30 to 300 GHz	Millimeter Waves
12		300 to 3000 GHz	Sub-millimeter waves

Table C-1

NOTE 1: "Band Number N" extends from 0.3 to 10N Hz to 3 x 10N Hz.

NOTE 2: Prefix k = kilo (10^3), M = mega (10^6)

2. **Electric Warfare Frequency Band Letter Designators.** The following broadband letter designators may be used as a matter of convenience in Electronic Warfare and Intelligence environments. They are not to be used in official correspondence, publications or instructions pertaining to frequency planning.

Electronic Warfare Frequency Band Letter Designators

BAND	FREQUENCY	CHANNEL WIDTH
A	0-250 MHz	25 MHz

Table C-2

3. **Emissions.** Emissions shall be designated according to their necessary bandwidths and their classification. Examples are given in Table C-3.

4. **Necessary Bandwidth**

a. The necessary bandwidth, as defined in Annex A and determined in accordance with paragraph 7 below shall be expressed by three numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth. The first character shall be neither zero nor K, M or G.

b. Necessary bandwidths

between 0.001 and 999 Hz shall be expressed in Hz (ltr H);

between 1.000 and 999 kHz shall be expressed in kHz (ltr k);

between 1.000 and 999 MHz shall be expressed in MHz (ltr M);

between 1.000 and 999 GHz shall be expressed in GHz (ltr G);

5. **Classification**

a. Emissions shall be classified and symbolized according to their basic characters as given below. The optional additional characteristics in paragraph 6 below will not normally be used, except where their use will assist in resolving cases of interference.

- (1) first symbol - type of modulation of the main carrier;
- (2) second symbol - nature of signal(s) modulating the main carrier;
- (3) third symbol - type of information to be transmitted.

Modulation used only for short periods and for incidental purposes (such as, in many cases, for identification or calling) may be ignored provided that the necessary bandwidth as indicated is not thereby increased.

b. First symbol - type of modulation of the main carrier.

- (1) Emission of an unmodulated carrier - N.
- (2) Emission in which the main carrier is amplitude-modulated (including cases where sub-carriers are angle-modulated).

NOTE 1: Examples 0.002 Hz = H002 etc

- (a) Double-sideband - A.
 - (b) Single-sideband, full carrier - H.
 - (c) Single-sideband, reduced or variable level carrier - R.
 - (d) Single-sideband, suppressed carrier - J.
 - (e) Independent sidebands - B.
 - (f) Vestigial sidebands - C.
- (3) Emission in which the main carrier is angle-modulated.
- (a) Frequency modulation - F.
 - (b) Phase modulation - G.
- (4) Emission in which the main carrier is amplitude and angle-modulated either simultaneously or in a pre-established sequence - D.
- (5) Emission of pulses ²;
- (a) Sequence of unmodulated pulses - P.
 - (b) A sequence of pulses modulated in amplitude - K.
 - (c) A sequence of pulses modulated in width/duration - L.
 - (d) A sequence of pulses modulated in position/phase - M.
 - (e) A sequence of pulses in which the carrier is angle-modulated during the period of the pulse - Q.
 - (f) A sequence of pulses which is a combination of the foregoing or is produced by other means - V.
 - (g) Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse - W.
 - (h) Cases not otherwise covered - X.

NOTE 2: Emissions where the main carrier is directly modulated by a signal which has been coded into quantified form (e.g. pulse code modulation) should be designated under paragraphs 3b(2)I or 3b(3).

- c. Second symbol - a nature of signal(s) modulating the main carrier:
 - (1) No modulating signal - (1).
 - (2) A single channel containing quantified or digital information without the use of a modulating sub-carrier³ - 1.
 - (3) A single channel containing quantified or digital information with the use of sub-carrier³ - 2.
 - (4) A single channel containing analogue information - 3.
 - (5) Two or more channels containing quantified or digital information - 7
 - (6) Two or more channels containing analogue information - 8.
 - (7) Composite system with one or more channels containing quantified or digital information, together with one or more channels containing analogue information - 9.
 - (8) Cases not otherwise covered - X.
- d. Third symbol - type of information to be transmitted⁴:
 - (1) No information transmitted - N.
 - (2) Telegraphy - for aural reception - A.
 - (3) Telegraphy - for automatic reception - B.
 - (4) Facsimile - C.
 - (5) Data transmission, telemetry, telecommand - D.
 - (6) Telephony (including sound broadcasting) - E.
 - (7) Television (video) - F.
 - (8) Combination of the above - W.
 - (9) Cases not otherwise covered - W.
- e. The classification of typical emissions is tabulated in Table C-1

NOTE 3: This excludes time-division multiples.

NOTE 4: In this context the word "information" does not include information of a constant, unvarying nature such as is provided by standard frequency emissions, continuous wave and pulse radars, etc.

6. Additional Characteristics for the Classification of Emissions

a. Paragraph 3 of this Annex describes the basic characteristics, with three symbols, for the classification of emissions. For a more complete description of an emission, two optional additional characteristics may be added.

The optional additional characteristics are:

- (1) Fourth symbol - details of signal(s).
 - (2) Fifth symbol - nature of multiplexing.
- b. Fourth symbol - details of signal(s).
- (1) Two-condition code with elements of differing numbers and/or duration - A.
 - (2) Two-condition code with elements of the same number and duration without error-correction - B.
 - (3) Two-condition code with elements of the same number and duration with error-correction - C.
 - (4) Four-condition code which each condition represents a signal element (of one or more bits) - D.
 - (5) Multi-condition code in which each condition represents a signal element (of one or more bits) - E.
 - (6) Multi-condition code in which each condition or combination of conditions represents a character - F.
 - (7) Sound of broadcasting quality (monophonic) - G.
 - (8) Sound of broadcasting quality (stereophonic or quadraphonic) - H.
 - (9) Sound of commercial quality (excluding categories given in sub-paragraphs 10 and 11) - I.
 - (10) Sound of commercial quality with the use of frequency inversion or band-splitting - K.
 - (11) Sound of commercial quality with separate frequency modulated signals to control the level of demodulated signal - L.
 - (12) Monochrome - M.

- (13) Colour - N.
- (14) Combination of the above - W.
- (15) Cases not otherwise covered - X.
- c. Fifth symbol - Nature of multiplexing.
 - (1) None - N.
 - (2) Code-division multiples* - C.
 - (3) Frequency-division multiplex - F.
 - (4) Time-division multiplex - T.
 - (5) Combination of frequency-division multiplex and time division multiplex - W.
 - (6) Other types of multiplexing - X.

7. **Determination of Necessary Bandwidths**

- a. For the full designation of an emission, the necessary bandwidth, indicated in four characters, shall be added just before the classification symbols. The necessary bandwidth shall be determined by one of the following methods:
 - (1) use of the formulae included in Table C-3 which also gives examples of necessary bandwidths and designation of correspondence emissions;
 - (2) computation in accordance with CCIR Recommendations;
 - (3) measurement, in cases not covered by (1) or (2) above.
- b. The necessary bandwidth so determined is not the only characteristic of an emission to be considered in evaluating the interference that may be caused by that emission.
- c. In the formulation of Table C-3 the following terms have been employed:

B_n = necessary bandwidth in hertz.

* This includes bandwidth expansion techniques.

B = modulation rate in bands.

N = maximum possible number of black plus white elements to be transmitted per second, in facsimile.

M = maximum modulation frequency in hertz.

- M_v = maximum significant frequency in megahertz of the NTSC television signal (frequency to be used in 3.8 MHz).
- C = subcarrier frequency in hertz.
- D = peak video deviation, ie, half the difference between the maximum and minimum values of the instantaneous frequency. The instantaneous frequency in hertz is the time rate of change in phase in radians divided by 2π .
- D_v = peak video deviation in megahertz.
- D_s = video deviation in megahertz caused by one or more audio sub-carriers.
- t = pulse duration in seconds at half-amplitude.
- t_r = pulse rise time in seconds between 10 & 90% amplitude.
- R = maximum transmission speed in bits per second.
- S = number of signalling states.
- K = an overall numerical factor which varies according to the emission and which depends upon the allowable signal distortion.
- N_c = number of baseband channels in radio systems employing multichannel multiplexing.
- f_p = continuity pilot sub-carrier frequency (Hz) (continuous signal utilized to verify performance of frequency-division multiplex systems).
- O = main carrier frequency offset due to luminance picture component (at low Average Picture Level) of the 525 line NTSC television signal.. This produces the effective carrier for chroma and sub-carrier signals. The carrier offset to be used is $0.2 D_n$ eg, 0.8 MHz offset for 4 MHz peak deviation.
- A = maximum significant sideband frequency caused by FM modulation of the highest FM modulated audio-program sub-carrier calculated according to the equation:

$$A = f_{sc} + (BA + 1) \times f_a$$

where:

f_{sc} = highest audio program sub-carrier frequency in megahertz.

and:

Ba = modulation index for the peak deviation of the sub-carrier caused by the top audio signal frequency. The peak deviation is normally considered to be 10 dB greater than the peak deviation caused by a reference audio test tone. The modulation index, Ba, is given by:

$$Ba = \frac{\text{peak audio deviation}}{\text{top audio signal frequency}}$$

fa = top audio signal frequency in megahertz modulating the highest audio program sub-carrier frequency.

V_a - video baseband bandwidth in megahertz.

E_D = energy dispersal bandwidth in megahertz.

EXAMPLES OF DESIGNATION OF EMISSIONS

Description of Emission	Necessary Badwidth		Designation of Emission
	Formula	Sample Calculation	
I. NO MODULATING SIGNAL			
Continuous Wave	-	-	NON
II. AMPLITUDE MODULATION			
1. Signal without Quantized or Digital Information			
Continuous wave Telegraphy, morse code	B _n = BK K = 5 for fading circuits K = 3 for non-fading circuits	25 words per minute; B = 20, K = 5 Bandwidth: 100 Hz	100HA1A
Telegraphy by on-off keying of a tone modulated carrier, morse code	B _n = BK + 2M K = 5 for fading circuits K = 3 for non-fading circuits	25 words per minute; B = 20, M = 1000 K = 5 Bandwidth: 2100 Hz = 2.1 kHz	2K10A2A
Selective calling signal using sequential single frequency code, single- sideband full carrier	B _n = M	Maximum code frequency is: 2110 Hz M = 2100 Bandwidth: 2110 Hz = 2.11 kHz	2K111H2B
Amplitude modulation used to modulate a carrier with digital bit stream	B _n = 2BK K = 1 (typically)	Microwave system is digitally modulated at a rate of 5 megabits per second. The carrier is amplitude modulated and 4 signalling states are used. B = $\frac{R}{\text{Log, 4}}$ = $\frac{5,000.000}{\text{Log, 4}}$ = 2500 kiloband Bandwidth: 5.0 x 10 ³ kHz = 5.0 MHz	

Table C-3

EXAMPLES OF DESIGNATION OF EMISSIONS

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Direct-printing telegraphy using a frequency shifted modulating sub-carrier, single-sideband, suppressed carrier (single channel)	$B_n = 2M + 2K$ $M = \frac{B}{2}$	$B = 50$ $D = 35 \text{ Hz (70 Hz shift)}$ $K = 12$ Bandwidth 134 Hz	134HJ2B
Telegraphy, multi-channel with voice frequency, error-correction, some channels are time-division multiplexed, single-sideband, reduced carrier	$B_n = \text{highest central frequency} + M + DK$ $M = \frac{B}{2}$	15 channels, highest central frequency is: 2905 Hz $B = 100$ $D = 42.5 \text{ Hz (85 Hz shift)}$ $K = 0.7$ Bandwidth: $2885 \text{ Hz} = 2.885$	2K89R7B
2. Telephony (Commercial Quality)			
Telephony, double-sideband (single channel)	$B_n = 2M$	$M = 3000$ Bandwidth: $6000 \text{ Hz} = 6 \text{ kHz}$	6K00A3E
Telephony, single-sideband, full carrier (single channel)	$B_n = M$	$M = 3000$ Bandwidth: $3000 \text{ Hz} = 3 \text{ kHz}$	3K00H3E
Telephony, single-sideband, suppressed carrier (single channel)	$B_n = M - \text{lowest modulation frequency}$	$M = 3000$; lowest modulation frequency is 300 Hz Bandwidth: $2700 \text{ Hz} = 2.7 \text{ kHz}$	2K70J3E
Telephony with separate frequency modulated signal to control the level of demodulated speech signal, signal-sideband, reduced carrier (Lincompes) (single channel)	$B_n = M$	Maximum control frequency is 2990 Hz $M = 2990$ Bandwidth: $2990 \text{ Hz} = 2.99 \text{ kHz}$	2K99R3E

Table C-3 (continued)

EXAMPLES OF DESIGNATION OF EMISSIONS

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Telephony, single-sideband, suppressed carrier (two or more channels)	$B_n = N_c M$ - lowest modulation frequency in the lowest channel	$N_c = 2$ $M = 3000$; lowest modulation frequency is 250 Hz Bandwidth 5750 Hz 5.75 kHz	5K75J8E
Telephony, independent sideband (two or more channels)	B_n = sum of M for each sideband	2 channels $M = 3000$ Bandwidth 6000 Hz = 6 kHz	6K00B8E
3. Facsimile			
Analogue facsimile by sub-carrier frequency modulation of a single-sideband emission with reduced carrier, monochrome	$B_n = C + \frac{N}{2} + DK$ $K = 1.1$ (typically)	$N = 1100$ corresponding to an index of cooperation of 352 and a cycle rotation speed of 60 rpm. Index of cooperation is the product of the drum diameter and number of lines per unit length. $C = 1900$ D = 400 Hz Bandwidth: 2890 Hz = 2.89 kHz	2K89R3C
Analogue facsimile; frequency modulation of an audio frequency subcarrier which modulates the main carrier, single-sideband suppressed carrier	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ $K = 1.1$ (typically)	$N = 100$ D = 400 Hz Bandwidth: 1980 Hz = 1.98 kHz	1K98J3C

Table C-3 (continued)**EXAMPLES OF DESIGNATION OF EMISSIONS**

Description of Emission	Necessary Badwidth		Designation of Emission
	Formula	Sample Calculation	
III. FREQUENCY MODULATION			
1. Signal with Quantized or Digital Information			
Telegraphy (single-channel) or selective calling signal	$B_n = 2M + 2DK$ $M = \frac{B}{2}$ 2 1.2 (typically) $K =$	$B = 100$ $D = 170$ Hz 85 Hz shift) Bandwidth: 304 Hz	304HF1B
Four-frequency duplex telegraphy	$B_n = 2M + DK$ $B =$ Modulation rate in bands of the fastest channel. If the channels are synchronized: $M = \frac{B}{2}$ (otherwise $M = 2B$) $k = 1.1$ (typically)	Spacing between adjacent frequencies = 4 Hz; synchronized channels $B = 100$ $M = 50$ $d = 600$ Hz Bandwidth: 1,420 Hz = 1.42 kHz	1K42F7B
2. Telephony (Commercial Quality)			
Commercial telephony	$B_n = 2M + 2DK$ $K = 1$ (typically, but under certain conditions a higher value may be necessary)	For an average case of commercial telephony), $D = 5,000$ Hz $M = 3,000$ Bandwidth: 16,000 Hz = 16 kHz	16K0F3E
Facsimile by direct frequency modulation of the carrier black and white	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ 2 1.1 (typically) $K =$	$N = 1100$ elements/sec; $D = 400$ Hz Bandwidth: 1980 Hz = 1.98 kHz	1K98F1C
Analogue facsimile	$B_n = 2M + 2DK$ $M = \frac{N}{2}$ 2 1.1 (typically) $K =$	$N = 1,100$ elements/sec; $D = 400$ Hz Bandwidth 1,980 Hz = 1.98 kHz	1K98F3C

Table C-3 (continued)

EXAMPLES OF DESIGNATION OF EMISSIONS

Description of Emission	Necessary Badwidth		Designation of Emission
	Formula	Sample Calculation	
IV. COMPOSITE EMISSION (see Table III-B)			
Radio-relay system, frequency division mutliples	$B_n = 2f_p + 2DK$ $K = 1$ (typically)	60 telephone channels occupying baseband between 60kHz and 300 kHz; ms per-channel deviation: 200 kHz; continuity pilot at 331 kHz produces 100 kHz rms deviation of main carrier $d = 200 \times 10_3 \times 3.76 \times 2.02 - 1.52 \times 10^3 \times 3.76 \times 2.02 - 1.52 \times 10^3 \text{ Hz}; \quad f_p = 0.331 \times 10^6 \text{ Hz}; \quad \text{Bandwidth}$ $3.702 \times 10^6 \text{ Hz} = 3,702 \text{ Mhz}$	3M7OF8E
Ratio-relay system frequency division mutlplex	$B_n = 2M + 2DK$ $K = 1$ (typically)	960 telephone channels occupying baseband between 60 kHz and 4,028 kHz; ms per channel deviation: 200 kHz; continuity pilot at 4,715 kHz produces 14 kHz rms deviation of main carrier. $d = 200 \times 10^3 \times 3.76 \times 5.5 = 4.13 \times 10^6 \times 3.76 \times 5.5 = 4.13 \times 10^6 \text{ Hz}; \quad M = 4,028 \times 10^6;$ $f_p = 4.715 \times 10^6$; $(2M + 2DK) f_p$ Bandwidth: 16.32 $\times 10^6 \text{ Hz} = 16.32 \text{ MHz}$	16M3F8E

Table C-3 (continued)

EXAMPLES OF DESIGNATION OF EMISSIONS

Description of Emission	Necessary Bandwidth		Designation of Emission
	Formula	Sample Calculation	
Radio-relay system, frequency division multiplex	$B_n - 2f_p$	600 telephone channels occupying baseband between 60kHz and 2,540 kHz; per-channel deviation: 200 kHz; continuity pilot at 8500 kHz produces 140 kHz rms deviation of main carrier. $D = 200 \times 10^3 \times 3.76 \times 4.36 = 3.28 \times 10^6 \text{ Hz}$; $M = 2.548 \times 10^6$; $K = 1$ $f_p = 8.5 \times 10^6$; $(2M = 2DK) f_p$ Bandwidth: $17 \times 10^6 \text{ Hz} = 17 \text{ MHz}$	17MOF8E
Stereophonic sound broadcasting with multiplexed subsidiary telephony sub-carrier	$B_n = 2M + 2DK$ $= 1$ (typically)	k Pilot tone system; $M = 75,000$ $D = 75,000 \text{ Hz}$ Bandwidth: $300,000 \text{ Hz} = 300 \text{ kHz}$	300KF8E

Table C-3 (continued)**EXAMPLES OF DESIGNATION OF EMISSIONS**

Description of Emission	Necessary Badwidth		Designation of Emission
	Formula	Sample Calculation	
IV. PULSE MODULATION			
1. Radar			
Unmodulated pulse emission	$B_n = \frac{2K}{t}$ K depends upon the ration of pulse duration to pulse rise time. Its value usually falls between 1 and 10 and in many cases it does not exceed to exceed 6	Primary Radar Range resolution: 150 m K = 1.5 (triangular pulse where t - t, only components down to 27 dB from the strongest are considered) 2 x (range resolution) Then t = velocity of light $= \frac{2 \times 150}{3 \times 10^6}$ $= 1 \times 10^6$ seconds Bandwidth: 3 x 10 ⁶ Hz = 3 Mhz	3MOOPON
2. Composite Emissions			
Radio-relay systems	$B_n = \frac{2K}{t}$ K = 1.6	Pulse positions modulated by 36 vice channel baseband; pulse width at half amplitude = 0.4 Bandwidth: 8 x 10 ⁶ Hz = 8 Mhz (Bandwidth independent of the number of voice channels)	8MOOM7E

Table C-3 (continued)

**STANDARD FORMATS FOR TEXT OF RADIO FREQUENCY
PROPOSAL/ASSIGNMENT/MODIFICATION/RENEWAL/REVIEW/DELETION
MESSAGES**

1. General

- a. Purpose. This document describes the Standard Frequency Action Format (SFAF) used for Department of Defense (DoD) radio frequency proposals, assignments, modifications, renewals, reviews, and deletions. Frequency assignment proposals for space or earth stations may be made in either ITU APPENDIX 3 format or the SFAF.
- b. Definitions. The following definitions apply to terms used in processing SFAF data into the Frequency Resource Record System's (FRRS) central data base.
- (1) Frequency Assignment. A frequency assignment is an authorization to operate, within prescribed parameters, electronic equipment that emits radio frequency (RF) energy. The authorization contains the assignment's technical parameters and administrative information. A frequency assignment is usually forwarded to the using organization via a SFAF message.
 - (2) Frequency Assignment Record. A frequency assignment record is a grouping of data entries pertaining to an authorized frequency assignment stored within a data base.
 - (3) Frequency Transaction. A frequency transaction is a formatted grouping of data entries used to request a proposal, a new assignment, an update, or deletion of a frequency assignment. A transaction always starts with Data Item 005 (Security Classification) and ends with the highest numbered data item used for that transaction.
 - (4) Message Part. A message part may contain one or more frequency assignment transactions. Each message part begins with Data Item 005.
 - (5) Data Item Number. A data item number (also referred to as a data item identifier) is used to identify each data item in a SFAF frequency assignment transaction. It consists of a unique-3 digit number followed by a period and a space. For example, 005. is used to identify the record's security classification. APPENDIX 1 contains a sequential listing of all valid SFAF data item numbers and applicable remarks/instructions.
 - (6) Data Item. A data item is made up of a data item number, a security classification indicator (if required), and the data entry. Throughout this text, the terms "item" and "data item" are also used when referring to an SFAF data item.
 - (7) Data Element. A data element is the most basic type of data entry. It consists of a series of letters and/or numbers immediately following the data item number. Normally, one data element equates it one data item. For example, FA (used in Data 113 to denote station class) and FT BRAGG (used in Data Items 301 and 401 to show antenna location) are both data elements.

(8) Data Entry. A data entry may contain one or more data elements. For example, 113.FA is a data entry consisting of the data item number (113.) and one data element (FA); 340. G,AN/TRQ-35 is a data entry consisting of the data item number (340) and two data elements: first, the equipment type code (G), and second, the equipment nomenclature (AN/TRQ-35). Multiple data elements in the same data entry are separated by a comma or, in some cases, are enclosed within parenthesis. For example 010. C(AF 880379).

(a) Single Occurring Data Entry. A single occurring data entry may contain either one or more data elements; however, the data entry can appear only once in a frequency assignment transaction are called multiple occurring data entries. Such data entries are normally separated by a slant bar (/), whereas data elements within an entry are usually separated by a comma (,).

(b) Multiple Occurring Data Entry. Data entries which may appear more than once in a frequency assignment transaction are called multiple occurring data entries. Such data entries are normally separated by a slant bar (/), whereas data elements within an entry are usually separated by a command (,).

In some cases, special rules apply as stated in APPENDIX 1.

2. Message Format. SFAF frequency assignment transactions are most frequently sent by message via the Automatic Digital Network (AUTODIN). The following guidance is provided for the preparation of these messages:

a. Headings. Message headings must be formatted in accordance with approved communications procedures.

b. Security Classification. The overall security classification of the message is based on that of the highest classified data item or combination of data items contained therein.

c. Subject. The subject line of the message begins with FREQUENCY PROPOSAL or FREQUENCY ASSIGNMENT, suffixed as required.

For example:

FREQUENCY PROPOSAL USA. For crisis or contingency requirements, include FOR CONTINGENCY COMMUNICATIONS and the unclassified plan name or number, if available. For example: FREQUENCY PROPOSAL FOR CONTINGENCY COMMUNICATIONS, USN (OP PLAN 207-81).

d. Text. A message may contain information pertaining to more than one frequency assignment. When this occurs, Item 005 (Security Classification) and Item 010 (Type of Action) must be the first items listed in each message part. All data items must be listed in a vertical format and be in the same numerical sequence as shown in APPENDIX 1. Each line in the message is limited to 69 characters (including spacing and punctuation marks). This limitation is based on the AUTODIN's maximum line-length capability and is not to be confused with the data item input length limitations specified in APPENDIX 1. If a data item requires more than one line of text, each additional line must be preceded by the data item

number or data item occurrence identifier. Multiple entries for the same data item may be included on the same line (e.g. 110A. K1030 110B. K1040), and continued on the next line when necessary. See paragraphs 3c(1) and 3f for details on entering more than one line of text for a particular data item.

e. Abbreviated Message Format. An abbreviated message format may be used for frequency proposals whose period of requirement will not exceed 90 days. As a minimum, the following data items must be included: 005, 010, 110, 113, 114, 115, 140, 141, 200, 207, 300, 301, 340, 400, 401, 440, 502, 803, and other applicable items in the 500 series. Note: For DCS high-frequency (HF) entry exercises, also include Data Items 303, 354, 403, 454; for pulsed emitters, also include Data Items 346 and 347; for aeronautical navigational aids and for air traffic control assignments, also include Data Items 303, 403, 711, 801.

3. Procedures. The following procedures must be followed when using the SFAF:

a. Prohibited Data Entries. The following symbols are not to be used as input data:

&	(ampersand)	?	(question mark)
:	(colon)	<	(less than)
;	(semicolon)	>	(greater than)
[(left square bracket)	%	(percent sign)
]	(right square bracket)	!	(exclamation mark)
/	(reversed slant bar)	::	(Insert Caret)
#	(number/pound sign)	"	(quotation mark)
@	(at sign)	'	(apostrophe)

b. Restricted Data Entries. The slant bar (/), comma (,), and dash (-) are used as delimiters, however, they may also be used as part of the text in data items as indicated below.

- (1) The slant bar may be used in Data Items 340 and 440 as part of a government nomenclature (e.g., AN/); in Data Items 343 and 443 as part of the J-12 number (e.g., 1374/2); and in Data Items 501, 503, and 520 as part of the free text comments. For use of the slant bar as a delimiter see paragraph 3c(1).
- (2) The comma can only be used as data in Data Items 152, 501, 503, 504, 520, and 705. For use of the comma as a delimiter see paragraph 3c(2).
- (3) The dash cannot be used in Data Items 300, 301, 400, 401. For use of the dash as a delimiter see paragraph 3d(1).

c. Data Item Occurrence Identifiers. Slant bars and commas may be used as data item occurrence identifiers as indicated below:

- (1) Slant Bars. Slant bars are used to (a) separate multiple occurrences of data entries within a data item (e.g. 500. SO49/CO75), (b) identify the order of occurrence of such data when modifying an existing record (e.g. 500/2. S165), and (c) identify the order of occurrence of the first data element in each additional line of text when multiple lines are required for a particular data item. When multiple occurrences of a

data item exceed the message input line-length limitation of 69 characters, continue entries on succeeding lines. However, start each succeeding line with the order of occurrence identifier of the first data element in that line (e.g., if a new transaction contains nine emission entries and seven entries were entered on the first line, the second line would begin with 114/8). If an order of occurrence identifier is not specified, number one is assumed.

Note: Do not split a data element between lines.

Order of occurrence identifiers are not used for free-text data items where each line begins with only the 3-digit data item number (e.g., Data Items 502, 520, 531, and 801-807).

(2) Commas. Commas are used to separate elements within a data entry (e.g., 340. G,AN/FRC-102). A combination of slant bars and commas can be used in the same data entry (e.g., 340. G,AN/FRC-22/G,AN/GRC-122). However, commas and slant bars cannot be used interchangeably; that is, if input instructions specify a comma a slant bar cannot be used, and vice versa.

d. Receiver Location Identifiers. Receiver location identifiers consisting of the letter R and a 2-digit number (01 through 30) are used to indicate whether the data is associated with the first, second, third, etc., receiver location. The receiver location identifier is entered immediately following the data entry reported for that item. For example, 400. CO,RO2. In this example, 400. (State/Country) is the data item identifier, CO (Colorado) is the data entry for that item, and R02 indicates that the data applies to the second receiver location. Note: If no receiver location identifier is specified, number one is assumed (e.g., 400. CO).

(1) Identical Data Entries. Data entries that are the same for consecutively numbered locations can be identified by inserting a dash between location identifiers. For example, 457. 12,RO1-RO5. In this example, 457. (Antenna Gain) is the data item number, 12 indicates the reported value for antenna gain (in decibels), and RO1-RO5 indicates that this antenna gain applies to receiver locations one through five.

(2) Nonidentical Data Entries. Data entries that are not the same for two or more consecutively numbered locations can be identified by inserting a space following the location identifier and the start of the next data element. For example, 457. 10,RO1-RO2 20,RO3. In this example, 457. Is the data item number, 10 indicates the antenna gain for the antenna, RO1-RO2 indicates that the antenna is at the first and second receiver locations, 20 indicates the gain for the antenna at the third receiver location (RO3).

e. Data Item Purge Identifiers. There are two types of data item purge identifiers: single-item purge identifier and mass-purge identifier.

(1) Single-Item Purge Identifier. A dollar sign following a data item number (e.g. 205.\$) means that the data item is to be purged from the existing record. If a data entry contains more than one data element, then the entire entry is deleted. If a data item contains multiple data entries, the order of occurrence of the entry(ies) to be purged must be specified. For example, 207/2. \$. In this example, the data item

occurrence identifier (/2) indicates that only the second operating unit designator in the record is to be purged. All remaining entries will be automatically renumbered during the purge process.

Note: If a data item occurrence identifier is not specified, number one is assumed (e.g., 340. \$). The data item purge identifier can be entered on one line for records containing multiple data entries, some of which are being modified or deleted (e.g., 207. 123ISS/456ISS/11BW could be changed by entering 207. 123CS/456CS/\$). An item being purged cannot be followed by an entry to add data in the same item, except Data Items 502, 520, and 531 which are discussed in APPENDIX 1.

(2) **Mass-Purge Identifier.** A special mass-purge feature is available to simplify the process of deleting large quantities of related information in Data Items 113, 340, 354, 400, 440, and 454. Using the dollar sign with these data item numbers will cause not only that particular data item to be purged, but all related data items as well. Note: If so data item occurrence identifier is specified, number one is assumed (e.g., 340. \$). The following are a few examples of how the mass-purge feature can be used.

- (a) 113.\$ will delete the first station class and the corresponding emission and power items (113, 114, and 115). If a record contains multiple entries, 113. \$, 113/2 \$, 113/3. \$, etc., would be needed to delete all entries, or 113. \$/\$/\$ could accomplish the same thing.
- (b) 340. \$ will delete all data associated with the transmitter equipment in Data Items 340 and 343-348. If multiple equipments are used, 340. \$, 340/2. \$, 340/3. \$, etc., would be needed to delete the additional equipments.
- (c) 354. \$ will delete the transmitter antenna and associated Data Items 354-357 and 359-363.
- (d) 400. \$,RO3 will delete all data associated with the third receiver location (Data Items 400 through 472).
- (e) 400. \$,RO3-RO5 will delete all data associated with the third, fourth, and fifth receiver locations (Data Items 400 through 472).
- (f) 440/3. \$,RO2 will delete all data associated with the third receiver equipment at the second receiver location (Data Items 440 and 443).
- (g) 454. \$,RO2 will delete all data associated with the receiver antenna at the second receiver location (Data Items 454-457 and 459-472).

f. **Multiple Record Identifiers.** Multiple record identifiers are used to link related data items utilizing the ABC concept (e.g., 113A, 113B, 113C, etc.). Multiple record identifiers can consist of a combination of data item numbers and data item numbers with alpha characters. Recommend like-numbered data items be entered in alphanumeric order (e.g., 113A, 113B, 113C, 114A, 114B, 114C). Multiple record identifiers may be used for all data items except 005, 006, and 010. Multiple record, identifiers can be used for all types of actions. To reduce the number of message lines, multiple record identifiers and their data elements may be entered on the same line as long as the last day entry on each line is

complete. Leave one space between the end of the previous data element and the star of the next multiple record identifier (e.g., 113A. FA 113B. MA).

The following rules apply:

- (1) For data items numbers without letters the data will apply to each record identified in that message part.
- (2) For data items numbers with a letter the data will apply only to the record identified by that particular letter.
- (3) Data item numbers with a letter will override those without a letter. Input for the data item number with a letter will appear in the record created by that particular letter. See Data Items 113 and 114 in the following example for further clarification.

```

005.
010.
102A.                102B.        102C.        102D.
110A.                110B.        110C.        110D.
113. LR 113C. MR 113D. MR
114. 150HOONON 114C. 6MOOPON

```

```

205A. EUSA 205D. EUSA
206A. 7SIG
209. JKOR

```

Based on the above example, four records (A, B, C, and D) would be either created or acted upon. Data Items 005 and 010 are the same in all four records. Note: When multiple record identifiers are used in the same message part, all records must contain the same security classification, special handling instruction code, declassification/review instructions, and type of action. Each frequency assignment would contain a unique serial number and frequency. Records A and B would contain 113. LR and records C and D would contain 113. MR. Record C would contain 114. 6MOOPON and records A, B and D would contain 114.15HOONON. Records A and D would contain 205. EUSA and records B and C would not contain a Data Item 205 if Data Item 010 equals N. If Data Item 010 equals M, A, C, F, or D, then Data Item 205 would remain unchanged in records B and C. Record A would contain 206. 7SIG and records B, C and D would not contain Data Item 206 if Data Item 010 equals N. If Data Item 010 equals M, A, C, F, or D, then Data Item 206 would remain unchanged in records B, C, and D. All records would contain 209. JKOR.

g. Types Of Action. There are seven types of action used for the input of SFAF frequency assignment transactions (see APPENDIX 1, Data Item 010). A combination of all types can be included in one multiple part message. Formats used for each type of action are described below.

- (1) New Type of Action (N). The New type of action can be used to create frequency assignments from one or more message parts.

(a) Creating a Frequency Assignment Using One Message Part. If one frequency is assigned to a transmitter location, a frequency assignment can be generated using a single message part. Figure 1 is an example of a message part used to create one HF assignment. However, rather than submit individual message parts for each new frequency assignment, the originator may use either of the following message formats to create more than one record.

005. U	340. G,AN/GRC-212
010. N	343. 5215
102. AF881234	357.9
110. K4726.5 (4785)	362.S
113. FA	363. H
114. 3K00J3E	400.J
115. K10	401. OWADA
130. 1HX	403. 354645N1393254E
144. O	406. 3000
200. USAF	440. G,AN/GRC-212
201. CINCPAC	443. 5215
202. PACAF	457.6
204. SAC	462. S
205. SAF	463. H
206. 475ABW	500. EO29
207. 1956CG	502. AF-OR-CHANNEL USAF
209. JJPN/JPAC	MANAGED ASSIGNMENT
300. J	701. T08
301. TOKOROZAWA	702. SAC 88-005
303. 354750N1393844E	705. COMMANDER,GIANT TALK

Figure 1. Example of a message part used to create one HF assignment

(b) Creating Multiple Frequency Assignments Using One Message Part. If more than one frequency is to be assigned to a transmitter location, multiple assignments can be generated using one message part. Simply use multiple record identifiers as described in paragraph 3f to identify data that is different in each of the records. However, Data Items 005, 006, and 010 must be identical for all records. Figure 2 shows how one message part would be formatted to create three assignments for three frequencies assigned to one transmitter location.

005. U	306. 50B
010. N	340. G, VARIOUS
102A. AF881234 102B. AF881235	357. 03
102C. AF881236	362. ND
110A. K6687.5(6686) 110B. K8730.5	363. H
(8729) 110C. K9645.5(9644)	400. CA,R01-R02
113.FX/FX	401.GELENDALE,R01 SEAL
114. 3K00J3E/3K00J2A	BEACH,R02
115. W400/W400	403. 344839N1171751W,R01
140. 880815	344521N1180513W,R02

144. Y	440. G,VARIOUS
200. USAF	457. 03
204. AFSC	462.ND
205. SD	463. V
206. SD	500. S144/S189/S362
300. CA	702. SD 88-003
301. HELENDALE	705. TRAINING
303. 344839N1171751W	

Figure 2. Example of a message part used to create three HF assignments

(c) Creating Multiple Frequency Assignments Using Multiple Message Parts. If one or more frequencies are to be assigned to more than one transmitter location, multiple records can be generated using multiple message parts. To do so, use multiple record identifiers as described in paragraph 3f and the Copy type of action as described in the following paragraphs.

(2) Copy Type of Action (C). The Copy type of action can be used to eliminate the need to reformat identical data. It can copy any approved SFAF record in the FRRS data base and use it as the basis for creating new assignments. More often, however, it is used to copy a transaction formatted in a previous part of the same message and use that transaction as a basis to create one or more new records. When the transaction being copied is contained within the text of the same message, the following data items are required for the Copy type of action: 005, 010, 102, 144, and any data items to be modified. Data Items 005, 010, 102, 110, 144, 300, 301, and data items to be modified are required if the record to be copied is located in the FRRS data base. Note that Data Item 102 (Agency Serial Number) is required to create a new assignment. Data items being changed in the copied record must be entered in the same manner as for Modification and Renewal types of action as described in paragraphs 3g(3) and 3g(6), respectively.

(a) Copying a Frequency Assignment Transaction Previously Formatted in the Same Message. To copy a transaction previously formatted in the same message requires that it be completely formatted. This previous transaction then becomes the basic transaction, parts of which can then be copied during the construction of other frequency assignment transactions. In subsequent message parts, Data Item 010 (Type of Action) will contain a C (Copy) plus the agency serial number of the basic transaction and the data that is different from the basic transaction. For example, 010. C(N812251). Figure 3 shows how two message parts would be formatted to create six new AF frequency assignments based on three frequencies assigned to two transmitter locations. In this example, multiple record identifiers are used in the first message part (see Data Items 102 and 110) to create three records for the first transmitter location (BERGSTROM). For the second transmitter location (PHOENIX), a C (Copy) is entered in Data Item 010 of the second message part along with the agency serial number of the first assignment in the first message part (Data Item 102A). Following this, the agency serial numbers of the last three assignments are entered in Data Items 102A, 102B, and 102C. Although all

three frequencies are repeated in part two of this example, the message originator has the option of re-entering only the second and third frequencies.

005. U	301. BERGSTROM
010. N	.
102A. AF803826 102B. AF803827	. (other data items are required)
102C. AF803828	.
110A. K5817.5 110B. K7469	702. TAC 80-520
110C. K9190	005. U
113. FX	010. C(AF803826)
114. 3K00J3E	102A. AF803829 102B. AF803830
115. K2.5	102C. AF803831
142. 850912	110A. K5817.5 110B. K7469
144. Y	110C. K9190
200. USAF	206. 2037CS
204. TAC	207. 107TCS
206. 1882CS	300. AZ
207. 602TCW	301. PHOENIX
300. TX	

Figure 3. Example of two message parts used to create six new Frequency assignments

(b) Copying a Record in the FRRS Data Base. (This capability is to be used only by MILDEP, CINCs, and Agency FMOs.) To copy a record already in the FRRS data base, enter the letter C (Copy) in Data Item 010 along with the agency serial number (within parenthesis) that identifies the existing FRRS record. Next, enter the required data items as listed in subparagraph 3g(2) (Copy Type of Action), plus the data items to be modified. Figure 4 is an example of this type of Copy transaction.

005.U	300. AZ
010. C(AF800115)	301. PHOENIX
102. AF810263	358. 115
110. M38	359. 60
144. Y	701. T04

Figure 4. Example of a message part used to copy a record in the FRRS data base and to make modifications to that record in order to create a new frequency assignment record.

(c) Copying a Previously Copied Record. The Copy type of action can also be used to copy a previously copied record. That is, each new record, whether it is the result of a New type of action or a Copy type of action, can be used as the basis to create one or more new records. This process can be continued as long as necessary, that is, a copy of a copy..of a copy (see Figure 5).

005. U

005. U

010. N	010. C(AR812019)
102A. ARS12017 102B. AR812018	102. AR812020
.	-
.(other data items as required)	.(other data items as required)
005. U	005. U
010. C(AR812018)	010. C(AR812017)
102. AR812019	102A. AR812021 102B. AR812022
.	.
.(other data items as required)	.(other data items as required)

Figure 5. Example of multiple message parts used to create six new Frequency assignments.

(3) Modification Type of Action (M). This type of action is used to modify frequency proposals or assignments; however, it cannot be used to modify the agency serial number, frequency, or transmitter state/country data items. As a minimum, Data Items 005, 010, 102, 110, 144, 300, 301, and any data items to be modified or deleted will be included. When a data item is to be modified, include the item number and the new data entry (the computer processor automatically deletes the old data entry except for Data Items 502, 520, and 531, in which case the new data entry is added to the existing data entry unless those data items are preceded by the data item number and a dollar sign as described in paragraph 3.e). All data items used will be listed in the same sequence as they appear in APPENDIX 1. Figure 6 is an example of a message used to change Data Item 114, delete the old Data Item 502 data entry, and add a new Data Item 502 data entry.

FROM JFP USMCEB WASHINGTON DC//NAVEMSCEN//
 TO JFMO PAC HONOLULU HI
 AIG 8788
 INFO CINCPACFLT PEARL HARBOR HI
 NAVCAMS WESTPAC GQ
 C O N F I D E N T I A L/N02420//
 ITEMS NOT IDENTIFIED AS CLASSIFIED ARE UNCLASSIFIED
 SUBJ: FREQUENCY MODIFICATION USN (U)
 A. JFMO PAC HONOLULU HI 021232Z. APR. 82
 1. FOLLOWING RESPONDS YOUR REQUEST REF A
 005. C,DEOADR
 010. M
 102. N773101
 104. J1021150675
 110. K16235
 113. FX
 114. (C)12K0B9W
 115.K10
 144.0
 300.J
 301. TOTSUKA
 502.\$
 502. (C) TO SATISFY REQUIREMENT FOR TWO ADDITIONAL VOICE

502. (C) CHANNELS DCS 77BB01 DURING CONTINGENCY
OPERATIONS.
701. 322.

Figure 6. Example of a message used to modify an existing frequency assignment.

A message used to change Data Item 114, delete the old Data Item 502 data entry, and add a new Data Item 502 data entry.

The receiver occurrences identifier must be used to modify data items when multiple receivers are involved. For example, if the antenna gain for the second receiver location is to be modified, it would be formatted as 457. 12,R02.

Frequency assignment records are normally reviewed every five years or whenever the assignment is modified. The following data items will be submitted when only the review date is to be changed: 005, 010, 102, 110, 144, 300, 301, and 700 series data items if applicable. Data Items 400 and 401 are also required for satellite down-link receivers. Figure 7 is an example of a message part used to update a record's review date.

005. U	300. MD
010. M	301. FT MEADE
102. AR760489	701. RAG
110. M32.05	702. A160222
144. Y	

Figure 7. Example of a message part used to update a record's review date.

(4) Deletion Type of Action (D). The following data items are required to delete an entire frequency assignment record from the FRRS central data base: 005, 010, 102, 110, 144, 300, and 301 (see Figure 8). Data Items 400 and 401 are also required in the case of satellite downlink receivers.

005. U	144. Y
010. D	300. TX
102. AF748121	301. BERGSTROM
104. J1921450874	701. T06
110. M9375	702. TAC 81-171

Figure 8. Example of a message part used to delete a frequency assignment record from the FRRS central data base.

(5) Notification Type of Action (F). This type of action is used to notify IRAC that a frequency authorized under a group assignment is being brought into use. This action is based on the authority granted previously by IRAC and stored in the GMF. This type of action is formatted the same as a New type of action, except that the agency serial number of the group assignment record stored in the GMF must be entered in Data Item 105. This type of action is limited to MILDEP/AGENCY USE ONLY.

(6) Renewal Type of Action (R). Frequency assignment records are normally reviewed prior to their expiration date or whenever modified. When only the expiration date is to be changed the following data items will be submitted: 005, 010, 102, 110, 141, 144, 300, and 301. Data Items 400 and 401 are also required for satellite down-link receivers. Enter other data items in the 700 series if applicable (see Figure 9). If the record contains Data Item 141 (Expiration Date) and data items other than Data Item 141 must be updated, an "R" type of action (Renewal) must be used and the other data items modified as outlined in paragraph 3g(3).

005. C	144. Y
010. R	300. NC
102. AR770489	301. FT BRAGG
110. M148.925	701. RAG
141. 860612	702. A110266

Figure 9. Example of a message part used for a Renewal type of action.

(7) Administrative Modification Type of Action (A). An "A" type of action is used to make changes in the three general categories outlined below.

(a) Typographical Corrections. These changes correct information in data base records that is different from that contained in the authorizing document (i.e., the GMF record for US&P assignments, or FMO, CINC, and JFP assignment messages for OUS&P assignments).

(b) Changes to Administrative Items. Changes to administrative data items (e.g., the 200 series and/or other non-IRAC data items) are made for standardization, reorganizational reasons, etc. Guidance concerning data items that may be changed for these reasons will be disseminated by a MILDEP, Agency, or CINC directive. Computer editing will be applied to all data items and the review data (Data Item 142) will not be changed unless it is specifically included in the administrative modification request. Input requirements are usually the same as those required for a Modification type of action (paragraph 3g(3)). In all cases, authority for administrative changes will be the JFP or appropriate MILDEP, agency, FMO, or CINC assigning authority (See Figure 10 for an example of a change made to Data Items 204 and 205).

005. U	205. WESTCOM
010. A	300. HI
102. AR834002	301. SCHOFIELD BARRACKS
110. M36.510	701. RAG
144. N	801. CORRECT ITEMS 204
204. WESTCOM	AND 205

Figure 10. Example of a message part used to administratively change an existing data base record.

(c) Multiple Record Changes. Multiple record changes (i.e., identical modifications to 25 or more records) are often required for compliance with international, national, or DoD rules and regulations. Changes to less than 25 records must be processed as individual transactions (see paragraph 3g(7)(b)). Requests for multiple record changes may be made by a narrative type of message or letter. The request must specify the type of action (Data Item 010 equals M or A) and whether the action is to be processed to NTIA for records in which Data Item 144 equals Y. Under current procedures, multiple record changes submitted to NTIA through the ECAC processor will result in changing the REV date in the GMF and the review date in the FRRS record. Multiple record changes submitted to NTIA via the FAS representative will result in only the requested data item being changed and the REV date will not be advanced in the GMF record, in this situation a copy of the same request must be forwarded to ECAC where the action will be taken using an Administrative Modification type of action as described in paragraphs 3g(7)(b). Multiple record changes requests must also specify the select criteria required to identify the records that are to be changed and the data items that are to be modified. Multiple record change requests should be carefully thought out and precisely worded to prevent inadvertent modification of non-applicable records. Input requirement may be supplied by using either data item numbers or narrative test. For example:

1. If Data Item 200 equals USAF or JNTSVC and (a) the agency serial number starts with AF and (b) Data Item 207 equals 376SW, change Data Item 207 to 388SW. Process multiple record changes with Data Item 010 equal to A and Data Item 144 equal to N.
2. If Data Item 200 equals USARMY and Data Item 114 emission equals 6K00A3E, change Data Item 114 emission to 6K00B9W. If Data Item 144 equals Y, enter Data Item 010 as M. If Data Item 144 equals 0, U, or blank, enter Data Item 010 as A

4. General Rules Regarding Transaction Security Classification and the Processing of SECRET Frequency Assignment Transaction Data to NTIA

a. Transaction Security Classification

(1) Data Item 005 (Security Classification). Data Item 005 is required for all SFAF frequency assignment transactions. For New type of actions, Data Item 005 must contain the record's security classification and any special handling instructions (Note that special handling codes are mandatory for proposals that require European/NATO co-ordination). For Modification and Deletion types of action, Data Item 005 must show the security classification and special handling instructions of the record to be modified or deleted; therefore, the security classification shown in Data Item 005 may be different from the actual security classification of the message used to modify or delete the record. For example, a form or message containing changes to an unclassified data item in a classified record is, by itself, unclassified unless the change contains data items that are considered classified when lasted

together. Therefore, an S or C entered in Data Item 005 of a Modification or Deletion type of action does not necessarily make that message classified; it only indicates the security classification of the existing SFAF record that is to be acted upon.

(2) Data Item 006 (Security Classification Modifications). Data Item 006 is only used in conjunction with Data Item 005 to change the security classification, special handling code, or declassification/review instructions of an existing SFAF record. Data Item 005 will contain the record's security classification and special handling instructions as they presently exist, and Data Item 006 will contain the new security classification, special handling code, and declassification/review instructions. Once again, the security classification of the form or message containing the modification is based solely on overall content.

(3) Classification Guide and Entry Procedures for SECRET or CONFIDENTIAL Data Items. The following guidelines and procedures apply to classified data items.

- (a) the SFAF requires that SECRET and CONFIDENTIAL data be identified by entering an S or C security classification indicator within parentheses immediately following the data item number (see Figure 11, Data Item 114/2). A (U) is not required for unclassified items if the sentence ITEMS NOT IDENTIFIED AS CLASSIFIED ARE UNCLASSIFIED is included on the line following the security classification of the message. The security classification indicator is not considered part of the data entry and is therefore not included in the maximum number of data characters permitted. Special handling codes are not entered at the data item level, they are entered only with the overall record security classification in Data Item 005.
- (b) Frequency assignment record maintained in the DoD automated central data base cannot be classified higher than SECRET.
- (c) Data items are generally classified according to their individual content. However, there are instances when unclassified data items may become classified when associated with other data items or when CONFIDENTIAL data items may become SECRET when associated with other CONFIDENTIAL or SECRET data items. For example, the frequency, equipment nomenclature, location, emission designation, and power data items may be unclassified as individual items but become classified when grouped together or when subsets are grouped in various combinations. Therefore, since it is not cost-effective to try to identify the various combinations, all data items within the group must be given the same security classification. The security classification of data items and record special handling instructions is normally based upon a source document (Security Classification Guide (SGA) or OPPLAN). The identification of this source document can be included in the free-text comments in Data Items 502 or 503. For example, 503. ITEMS CLASSIFIED IAW OPPLAN 88-04.
- (d) Paragraph 3g(1) and Figures 1 and 2 showed how to create unclassified records and explained the relationship of data item numbers and multiple record identifiers. How multiple occurring data items may be classified

individually or in groups is shown in Figure 11. The following subparagraphs (1 through 6) refer to the data items shown in Figure 11.

1. The special handling code for the overall record security classification is entered only in Data Item 005. Nowhere else in the record should special handling code information be entered except for those records which may require special handling (e.g., Proprietary Information, Not Releasable to Foreign Nationals (NOFORN), etc.). In such cases, free-text special handling instructions may be placed in Data Item 502 or 503.

2. Multiple data items with the same security classification (e.g., Data Item 113) may be entered on the same line to reduce message length.

3. Only one security classification must be entered per data item. Such data items must be entered in numerical order, the emission designators (Data Item 114) are a four-line entry because the second and fourth entries (Data Item 114/2 and 114/4) are CONFIDENTIAL. If the first and second entries were classified CONFIDENTIAL and the third and fourth entries were UNCLASSIFIED, it could have been a two-line entry. For example:

114. (C)800H00J2B/800H00J2B
114/3. 3K00J3E/K00J3E

4. The power levels (Data Item 115) are a multiple data item entry. Since the security classification of all four entries is the same (CONFIDENTIAL), the data item is entered horizontally with slant bars to separate the four entries.

5. Data concerning the third receiver location is classified CONFIDENTIAL and is listed separately.

6. The Description of Requirements (Data Item 502) provide a description of the assignment and are classified CONFIDENTIAL. Note that although this single data item is entered in paragraph form, the data item number and security classification appear on both lines.

C O N F I D E N T I A L (EXAMPLE CLASSIFICATION ONLY)

ITEMS NOT IDENTIFIED AS CLASSIFIED ARE UNCLASSIFIED

SUBJ: PACAF FREQUENCY ASSIGNMENT ACTION

005. CK,DEOADR

010. N

102. AF882345

110. (C)K7624.5 (7623)

113. FX/FX/FX/FX

114. 3K00J3E

114/2. (C)800H00J2B

114/3. 3K00J3E
 114/4. (C)800H00J2B
 115. (C)W400/W20/W400/W20
 130. 3HX
 140. 881012
 144. 0
 200. USAF
 201. CINCPAC
 202. PACAF
 204. PACAF
 205. 13AF
 206. 3CSG
 207. 1961CG
 209. JPHL/JPAC
 300. PHL
 301. CLARK
 303. 151101N1203330E
 340. (C)G,AN/URG-99X
 343. 9999
 357. 9
 362. S
 363. H

Figure 11. Example of a message with classified and unclassified multiple transmitter and receiver data.

400. HI,R01 GUM,R02
 400. (C)PAC,R03
 401. WAHIAWA,R01 FINEGAYAN,R02
 401. (C)AIRCRAFT,R03
 403. 212529N1580540W,R01 133455N1445050E,R02
 440. (C)G,AN/URG-99X,R01-R03
 443. 9999, R01-R02
 457. 9,R01-R03
 462 S,R01-R03
 463. H,R01-R03
 502. (C)REQUIRED TO SUPPORT CONTINGENCY AND
 RECONNAISSANCE IN THE PACIFIC AREA.
 701. 708
 702. PACAF 88-0001
 705. (C)COMMANDER,BLUE GOOSE
 707. 253-11

Figure 11 (Continued). Example of a message with classified and unclassified multiple transmitter and receiver data.

(e) To declassify the entire record shown in Figure 11 would require the entry of the present record security classification (008. CK,DEOADR),

followed by the Security Classification Modification data item (006. U) and the other data items necessary for a modification as indicated in paragraph 3g(3). This modification would not change the data content, but would change all CONFIDENTIAL data items to UNCLASSIFIED and remove the special handling restriction.

(f) Paragraph 3g(3) explained the format used to modify unclassified frequency proposals or assignments. Figure 12 shows how to modify the classified data items contained in Figure 11. The following subparagraphs (1 through 4) refer to the data items shown in Figure 12.

1. The complete record classification (Data Item 005) must be re-entered.
2. The first power level in Data Item 115 (115/1) has been increased from W400 to K1.5. Note the security classification had to be re-entered. The second and fourth power level entries (Data Items 115/2 and 115/4) were downgraded to UNCLASSIFIED (it could also have been entered as 115/2 (U)W20 and 115/4. (U)W20). Since there was no change to the third power entry, no data was entered.
3. Data Items 502, 531 may be entered by using the purge-and-replace techniques as follows:

502. S
502. New Data
520. \$
520. New Data
531. \$
531. New Data

If the purge-and-replace technique is not used, then the rules stated in sub-paragraph 4 below must be carefully followed.

4. The new data entry in Data Item 502 is automatically added to the existing data entry shown in Figure 11. If the existing data was to be deleted, a purge identifier (e.g., 502. S) would have been inserted on the line preceding the new data entry (see paragraph 3e(1)).
IMPORTANT! THE SECURITY CLASSIFICATION OF A NEW ENTRY WILL AUTOMATICALLY PURGE AND REPLACE THE SECURITY CLASSIFICATION OF THE EXISTING ENTRY.
Therefore, because of the importance of this unique feature, the rules in TABLE 1 must be followed to ensure that the entire data item is properly classified whenever it is modified. After being modified, Data Item 502 would appear in the record as follows:

502. REQUIRED TO SUPPORT CONTINGENCY AND
RECONNAISSANCE IN THE PACIFIC AREA. JOINT
RESPONSIBILITY OF PACAF AND SAC.

Note that in the above example the entire Data Item 502 entry was downgraded (IN ERROR!) from CONFIDENTIAL to UNCLASSIFIED because the new data entry was classified CONFIDENTIAL. The correct data entry should have been:

502. (C) JOINT RESPONSIBILITY OF PACAF AND SAC.

C O N F I D E N T I A L

ITEMS NOT IDENTIFIED AS CLASSIFIED ARE UNCLASSIFIED

SUBJ: FIVE YEAR REVIEW

005. CK,DEOADR

010. M

102. AF792391

110. (C)K4624.5

115. (C)K1.5

115/2. W20

115/4. W20

144.0.

300.J

301. TACHIKAWA

502. JOINT RESPONSIBILITY OF PACAF AND SAC.

701. SDS

Figure 12. Example of a message used to modify a classified record.

TABLE 1 RULES FOR CLASSIFYING ITEMS 502 AND 520

RULE: If the classification of the existing data is: xxxx, and the classification of the new data being added is: yyyy, then the classification symbol to be entered with the new data must be: (z).

S/N	Existing Data (xxxx)	New Data (yyyy)	Classification symbol (z)
1	(no data)	UNCLASSIFIED	blank or (U)
2	(o data)	CONFIDENTIAL	(C)
3	(no data)	SECRET	(S)
4	UNCLASSIFIED	UNCLASSIFIED	blank or (U)
5	UNCLASSIFIED	CONFIDENTIAL	(C)
6	UNCLASSIFIED	SECRET	(S)
7	CONFIDENTIAL	UNCLASSIFIED	(C)
8	CONFIDENTIAL	CONFIDENTIAL	(C)
9	CONFIDENTIAL	SECRET	(S)
10	SECRET	UNCLASSIFIED	(S)
11	SECRET	CONFIDENTIAL	(S)
12	SECRET	SECRET	(S)

- b. Processing SECRET Frequency Assignment Transactions to NTIA. SECRET frequency assignment transactions will be sent to NTIA as paper documents in Code-Z format. However, SECRET frequency data, when disassociated from other SECRET data in the transaction, will be downgraded to CONFIDENTIAL and forwarded to NTIA (by ECAC), along with UNCLASSIFIED data, using automated procedures. (The record in the FRRS data base will always contain the SECRET frequency data as submitted by the cognizant authority.)

GUIDE TO THE STANDARD FREQUENCY ACTION FORMAT

All data items listed in this appendix are not required for every frequency assignment transaction. Required data items are based on type of radio service, i.e., radio-navigation, aeronautical radio navigation, space, etc. Data item numbers not listed are reserved for future use. Data items marked with one asterisk (*) are used by US Forces for data that must be sent to the NTIA for approval. Data items marked with two asterisks (**) are reserved for use by headquarters of the Army, Navy, Air Force, DISA, NSA, and CINCs. Agencies may authorize use of cited items by subordinates, as desired. Data items marked with three asterisks (***) are computer generated by the DoD FRRS central data base.

The meaning of information appearing within parentheses directly below the title of each data item is as follows:

- a. Number(s) appearing within the first set of parentheses indicate the maximum number of characters (including spaces) that can be entered for that data item. It does not include the data item number itself, the period and space following the data item number, the security classification indicator (U, C or S) when present, or marks of punctuation used to separate multiple entries.
- b. The letter S or M appearing within the second set of parentheses indicates whether a data item is a single data entry or a multiple data entry item. A single data entry item can be entered only once in a record, a multiple occurring data item can be entered more than once.

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ADMINISTRATIVE DATA

005 Security Classification. (2,6)(S) Enter the overall security classification of the frequency proposal or assignment and appropriate special handling code, if required, from the following lists:

Classification Codes

U - Unclassified
C - Confidential
S - Secret

Special Handling Codes

B - Releasable to soil country & NATO only.
E - Exempt from Freedom of Information Act - handle as FOR
OFFICIAL USE ONLY in accordance with DoD Instruction
5400.7.
F - Not releasable to foreign nationals
H - Releasable to soil country only.
J - Contingency assignment. Has unified commander comments only.
Not releasable to foreign nationals unless formally coordinated
K - Permanent assignment. Available for contingency use within
theater after co-ordination and approval of cognizant unified
commander. Releasable to all nations.
L - Air Force limited distribution
N - Releasable to NATO only.
P - Proprietary.
Q - Proprietary with limited distribution.
R - Restricted Data
W - Formerly restricted data.
X - Not releasable to foreign nationals with limited distribution.
Z - Releasable to NATO only with limited distribution.

Declassification/Review Instructions. For SECRET or CONFIDENTIAL records, follow the classification with a comma and the declassification instructions in the following format:

DEYYMM - Declassification on: Year and month (the last day of the month is assumed - see example)

DEOADR - Declassify on: Originating Agency Determination Required

Examples: 005. S,DEOADR
005. CB,DE8311
005. U

006 Security Classification Modification. (2,6)(S) If the record's security classification, special handling code, or declassification/review instructions is to be changed, enter the new security classification data and make appropriate classification code changes to the items that are affected.

Examples: 006. SB,DE8807
006. U
006. CB,DEOADR

010 Type of Action. (1,12)(S) Enter a single letter to describe the type of action as shown below.

Note: This item is not stored in the data base.

A - Administrative Modifications.

C - Copy. Enter the letter C followed by the agency serial number (in parenthesis) to copy any approval data base record. Enter the letter C followed by the agency serial number to copy a record formatted in a previous part of the same message. Add only those items to be changed. (To be used only in accordance with MILDEP/Agency/Unified Command procedures.)

D = Delete.

*** E - Expired. Computer generated at NTIA indicating the record has expired from the GMF and is being removed from the FRRS.

** F - Notification. Notifies the activation of a frequency for a particular station or stations under the authority of a group assignment.

M - Modification.

N - New.

R - Renewal. Used to extend the expiration date of a temporary assignment. Other data may be changed as necessary.

Examples: 010.M
010. C(AR814128)

020 Proposal References. (64)(M)** Enter the requestor's message DTG with plain language address (PLAD) or letter reference.

For proposals transmitted via AUTODIN, the DTG will be automatically entered into each transaction record. The DTG will appear in FRRS transaction files only; it will not appear in the GMF or FRRS master files.

Example: 020. 041325Z DEC 87

101 FRRS ID. (6) (S) *** This data item is optional. Enter the record's FRRS ID for modification, a deletion, and renewal types of action. When more than one frequency is listed in data item 110, enter the corresponding FRRS ID numbers as Data Items 101A, 101B, etc.

Example: 101A. PA32CF 101B. PA25GE

102 Agency Serial. (10)(S). The agency serial number is required for all types of actions to be entered into the FRRS central data base. The serial number is a unique identifier for each frequency assignment. If more than one frequency is listed in Data Item 110, enter the corresponding agency serial numbers as Data Item 102A, 102B, etc.

Example: 102A. N775163 102B. N783105

103 Interdepartment Radio Advisory Committee (IRAC) Docket Number. (8) (M) *-*** This is a computer generated NTIA output item only. Provides three IRAC docket numbers as follows:

Docket number for current modification or renewal;
Docket number for last modification or renewal;
Original docket number for this assignment.

Example: 103. I8115742/17625457/17132646

104 Assignment Authority. (15)(M) Identifies the existing assignment message. Required for Navy modification/delete actions, optional for all others.

Example: 104. JO212241180

105 List Serial Number. (10)(S) *-** Enter the list serial numbers only if the type of action is F (Notification).

Example: 105. N765530

106 Serial Replaced Delete Date. (10,6)(S) *-** If an existing assignment record is to be deleted from the GMF with a New or Notification type of action, enter the agency serial number of the existing assignment followed by the desired date of deletion in year-month-day order.

Example: 106. N820512,831005

108 Docket Numbers of Older Authorizations. (35)(M) *-** This data item is optional. Enter up to 35 alphanumeric characters for DOCKET NUMBERS OF OLDER AUTHORIZATIONS to be retained in a New or Notification action as applicable. Multiple docket entries are allowed within a 35-character line by separating them with a comma. Authorization dates and serial numbers may also be entered along with the docket numbers within a 35-character line by separating them with commas.

Examples:

108. 184729 - Docket only

- 108. 173621, 5704 - Docket and date
- 108. 167543, 5510, N550142 - Docket, date, and serial
- 108. 189432, 16723419 - Two dockets
- 108. 16943591, AF690431 - Docket and serial

EMISSION CHARACTERISTICS

110 Frequency(ies). (11 or 11-11 or 11(11)) (S) Enter the discrete frequency or frequency band assigned to the unit and/or required for the equipment described in the assignment. A reference frequency, if included, is the assignment of a suppressed or reduced carrier sideband. For a frequency band assignment, enter the lower frequency and the upper frequency (separated by a dash) with the frequency unit indicator preceding the lower frequency. For sideband operations, enter the reference frequency in parentheses after the assigned frequency. For frequency band(s) that are to be excluded from a given frequency band, enter the excluded bands in Data Item 111 (See Example A). Precede the frequency value with unit indicators as follows:

- K - if frequency is less than 30 MHz
- M - if frequency is at least 30 MHz, but less than 100 GHz
- G - if frequency is at least 100 GHz, but less than 3 THz
- T - if frequency is 3 THz or greater.

Insert a decimal point only if there is a significant digit to the right of the decimal point. If more than one frequency or more than one band of frequencies is listed, enter the first as Data Item 110A, the second as 110B, etc., (See example B). Do not enter the unit indicator with the upper-limit value of a band.

NOTE: If a different station class, emission, and power applies to each frequency (band), use the same multiple record identifiers in Data Items 113, 114, and 115 as were entered in Data Item 110 (See example B).

Example A: 110. M13250-15700
111. M14770-14930

Example B: 110A. K6737.5(6736) 110B. K17034
113A. FX 113B. FX
114A. 3K00J3E 114B. 6K00J7B
115A. K1 115B. K10

Example C: 110. K8598
113. FX/FX
114. 6K00B9W/12K00B9W
115. K10/K10

A proposal might read as follows:

110. M138-144 (TWO FREQUENCIES IN BAND)

111 Excluded Frequency Band. (23)(M) Enter the frequency band or bands to be excluded (in ascending order) from the frequency band data entered in Data Item 110.

Separate multiple frequency bands by a slant bar. Do not enter the K, M, G, or T indicator with the upper-limit value. When more than one frequency band is listed in Data Item 110, enter the corresponding excluded frequency bands as Data Items 111A, 111B, etc.,.

Example: 111. M960-1770/M2200-2400

113 Station Class. (4)(M) Enter standard station class symbol(s). Include the suffix "R" if a fixed or mobile station is used as a repeater. (Data Items 113, 114, and 115 are interrelated and an entry in any of the three data items must be accompanied by a corresponding entry in the other two items.) Separate multiple entries with a slash.

Example: 113. FX/FX

114 Emission Designator. (II)(M). The emission designator contains the necessary bandwidth and the emission classification symbols. The necessary bandwidth will be entered with the unit designator in the position that the decimal would normally occupy, use:

H	-	if value is less than 1000 Hz
K	-	1 kHz to values less than 1000 kHz
M	-	1 MHz to values less than 1000 MHz
G	-	1 GHz or greater.

Doppler shift shall not be included in the frequency tolerance or bandwidth of emission; however, when Doppler shift is significant, it should be reported in Data Item 520.

Example: 114. 2K50J3E/2K50J7B

115 Transmitter Power. (9)(M) Enter (1) carrier power (pZ) for A3E sound broadcasting in the broadcasting service, (2) meanpower (pY) for other amplitude modulated emissions using unkeyed full carrier, and for all frequency modulated emissions, and (3) peak envelope power (pX) for all emission designators other than those referred to in (1) and (2) above, including C3F television (video only). Express the power to a maximum of five decimal places and precede the entry with the unit designator as follows:

W	-	if power is less than 1000 watts
K	-	if power is at least 1 kW but less than 1000 kW
M	-	if power is at least 1 MW but less than 1000 MW
G	-	if power is 1 GW or greater.

Example: 115. K1.5/K.1.5

TIME/DATE INFORMATION

130 Time. (4 or 1 (4)(S) The period indicated is not a limitation or restriction but rather the normal period of time during which the availability of the frequency is required. Use the appropriate number as follows:

1	-	regular, not limited to workweek
---	---	----------------------------------

- 2 - regular, workweek
- 3 - occasional, not limited to workweek
- 4 - occasional, workweek

For stations in the fixed service below 29890 kHz, the above number will be followed by one of the following symbols to indicate the time of availability on a daily basis:

- HX - For stations operating intermittently throughout the 24-hour day or for circuits with no specific working hours
- HN - Night service
- HU - Day service
- H24 - Continuous 24 hour service

- HT - For transition period service or the specific time (Universal Greenwich Time (UGT)). Enter, as a four-digit number in parentheses, the actual time per period of operation during the 24-hour day. The first two digits are the nearest whole hour of start time, and the last two digits are the nearest whole hour of end time.

Examples: 130. 2
 130. 1H24
 130. 4(1013)

140 Required Date. (6)(S) Enter the year, month, and day (YYMMDD) assignment or modification as required.

NOTE: This data item is not stored in the data base:

Example: 140. 790101

141 Expiration Date. (6) (S) If the assignment is for less than five years enter the year, month, and day (YYMMDD) the requirement for use of the assignment will end. Use of this data item indicates a temporary assignment.

NOTE: Assignments will be automatically cancelled on their expiration date.

Example: 141. 820622

142 Review Date. (6)(S) Computer generated if blank. Enter the year, month, and day (YYMMDD) if the desired review date is less than five years.

Example: 142. 831231

144 Record Indicator. (1)(S) Use the appropriate code listed below:

- Y - assignment record is to be processed through IRAC
- U - assignment record is inside USP and is not to be processed through IRAC.
- 0 - assignment record is outside USP and is not to be processed through IRAC

N- existing IRAC assignment contains a value of Y but this transaction is not to be purchased through IRAC. This value will not be stored in the GMF record.

Example: 144. Y

145 IFRN Registration. (1, 20)(S) The International Frequency Registration Board (IFRB) Registration data item indicates the action required to register an assignment to the IFRB. Enter the appropriate indicator from the following list:

R- accepted and registered by IFRB
U- notified to IFRB but negative decision
I- registration with IFRB on an insistence basis
O- not notified to IFRB
P- pending notification to IFRB
M- registered with IFRB but needs to be modified
Y- IFRB registration required.

Example: 145. R

146 DCS Trunk ID. (6)(M) ** Enter the DCS trunk identifier assigned by DISA (See Chapter 6 of DCAC 310-65-1).

Example: 146. 45CSO1/45USO2

147 Joint Agencies. (4)(M) ** Leave this data item blank unless Data item 200 equal JNT. For a joint application, enter the appropriate abbreviation of the joint agencies (maximum of 3). Enter the agency identified in Data Item 102 as the first joint agency. Separate entries with a slash. Enter H for unidentified agencies in non-IRAC assignments.

Examples: 147. AR/FAA
147. N/AF/J
147. H

151 Co-ordination Indicator. (1) (S) ** Enter C for Canadian, M for Mexican, or B for both when the assignment is to be co-ordinated with those governments.

Example: 151. C

152 Co-ordination Data. (1,35)(M) ** For new assignments replacing existing assignments (serial replaced actions), enter comments as previously co-ordinated (by the FAS Secretary) with Canada or Mexico. Comments for other new assignments will be entered by NTIA FAS Secretary when co-ordination comments are received from Canada or Mexico.

Examples: 152. M.,780029, NHIA
152. C,750361, NO MOBILE USE WITHIN 40 MI
152 C,RAD OF BURNABY BC

ORGANIZATIONAL INFORMATION

The 200-series of data items serve two major purposes: (1) as applicable, they identify the frequency management chain responsible for managing the assignment and the organizations having an area interest in the assignment, and (2) they are also used for the selection and distribution of records.

200 Agency. (6)(S) Enter one of the following Service or Agency abbreviations as appropriate: USA, USN, USAF, DISA, NSA, or JNT. If JNT is entered, Data Item 147 must be completed.

Example: 200. USA

201 Unified Command. (8)(M) Enter the unified command (CINCCENT, CINCEUR, CINCPAC, CINCSO, JFMOLANT, etc.) or designated representative for the area in which this assignment will be used. Separate entries with a slash.

Examples: 201. CINCPAC
201. CINCEUR/CINCSO/JFMOLANT

202 Unified Command Series. (8)(M) Enter the organization within the unified command area if one exists (NAVEUR, WESTCOM, PACAF, PACFLT, USAFE, USAREUR, etc.) that is responsible for managing this assignment.

Examples: 202. PACAF
202. USAREUR

203 Bureau. (4)(S) This data item identifies the bureau to be included in the record.

Example: 203. HW

204 Command. (18) (S) Enter the frequency management level that is subordinate to the responsible agency when it is different from the installation frequency manager.

Example: 204:SAC

205 Subcommand. (18)(S) Enter the frequency management level between the command and installation frequency manager when it exists.

Example: 205. 5AF

206 Installation Frequency. (18) (S) Where applied, this normally is the Manager station, base, or fort-level frequency management office for the location of the operating unit.

Examples: 206. 2078CSF
206. ISCFTBRAGG
206. NASPAXRV

207 Operating Unit. (18)(M) Enter the name or designation of the organization using the frequency assignment.

Examples: 207. 376SW/602TCW
207. SUBRON18

207. 82DIV/517ARTY

208 User Net/Code. (6)(M) Enter codes as directed by the responsible agency.

For Army: enter Net Control Code.

For Navy: enter Unit Identification Code (UIC) of operating unit identified in Data Item 207 or 302.

Examples: 208. N52618
208. A1204

209 Area AFC/DOD AFC/Other Organizations. (18)(M) Enter the DoD AFC, CINC, service area other Organizations frequency management office or other organization not provided in Data Items 200-208. Separate multiple entries with a slant bar.

Examples: 209. JJPN
209. WAMR/NFCWUS
209. JPAC/DCAPAC/DCAEUR

TRANSMITTER LOCATION DATA

Enter only one transmitter location per record. If more than one transmitter location is associated with this assignment, enter as separate message(s) or message part(s). If message parts are used, reference items to first message part.

300 State/Country. (4)(S) Enter the name or standardized abbreviation of the state, country, or area in which the transmitting antenna is located.

Examples: 300. IN
300. LANT
300. SPCE

301 Antenna Location. (24)(S) Enter the name of the actual location of the transmitter antenna. Military installations are considered to be a city or other geographical subdivision. In certain cases non-geographical data is used, e.g., MOON, MISSILE, AIRCRAFT, SHIPS, GEOSTATIONARY or NONGEOSTATIONARY. This entry will be abbreviated if:

- a. The location is the same as that entered in Data Item 300.
- b. The location contains one of the following words:

Location Word	Abbreviation
Camp	CP
District	DI
Division	DV
Fort	FT
Mount	MT
Mountain	MTN

Proving Grounds
Saint

PG
ST

c. The location name exceeds 24 characters after applying b above. If an entry has been used in other assignment records, use the same one. If not previously used, shorten entry to 24 characters and enter the full text in Data Item 801 for review by the assignment authority.

Examples: 301. NASHVILLE
301. NONGEOSTATIONARY

302 Station Control. (18)(S) Enter the operating unit that controls, either administratively or electrically, the transmitter station if different from Data Item 207.

Example: 302. SUBRON17

303 Antenna Co-ordinates. (15)(S) Enter geographical co-ordinates (degrees, minutes, and seconds) for the antenna location. If the seconds are not known, insert XX for the seconds, except in the case of NAVAIDS, geo-stationary satellites, and microwave facilities. If station is aboard a non-geo-stationary satellite, leave both latitude and longitude blank. Use leading zeros as appropriate for degrees, minutes, or seconds. Degrees latitude require two digits, degrees longitude require three digits. Leave the data item blank if the transmitter Antenna Location (Data Item 301) is an area for which co-ordinates cannot be applied. Enter N or S for latitude and E or W for longitude.

Examples: 303. 214216N1171039W
303. 351952NO9826O5W
303. 0422XXS17802XXE
303. 000000N1750000E

304 Call Sign. (8)(S) This data item is for the international call sign assigned to the transmitting station. Leave blank if it is either a local voice or tactical call sign, or if it is not applicable. For navigational aids, this data item is used for the identifier instead of a call sign.

Examples: 304. WUH55
304. AVV

306 Authorized Radius. (5)(S) If the station is portable, mobile, and/or Radius transportable, enter a radius (in statute) miles from the co-ordinates listed in Data Item 303) to describe the area in which the transmitter station will operate. Suffix the mileage entry with a T if the radius applies only to the transmitter station, or a B if the radius applies to both the transmitter and receiver stations (Note: When both fixed and mobile stations will transmit on the same frequency, leave this item blank and enter the radius of the mobile station in Data Item 406).

Examples: 306. 30T
306. 150B

SPACE STATIONS

Data Items 314 through 321 are to be used for unique space station data. Leave Data Items 315 through 319 blank for geo-stationary satellites.

314 SDC Object Number. (5)(S) If known, enter the Space Defense Center (SDC) object number as listed in the SDC catalogue.

Example: 314. 7152

315 Equatorial Inclination Angle. (4)(S) Enter equatorial inclination angle (degrees).

Example: 315. 34.7

316 Apogee. (5)(S) Enter Apogee (Statute miles).

Example: 316.23500

317 Perigee. (5)(S) Enter Perigee (Statute miles).

Example: 317. 200

318 Period of Orbit. (7)(S) Enter period of orbit. If it is less than 24 hours, enter time in hours followed by the letter H. If it is 24 hours or more, enter the number of days, followed by the letter D.

Example: 318. 19.6H

319. Number of Satellites. (2)(S) Enter the number of non-geostationary satellites in the system.

Example: 319. 1

321 Power Density. (4)(S) For earth or space stations, or terrestrial stations (including experimental) employing earth or space station techniques, insert the maximum power density per hertz (in dBW) supplied to the antenna. For negative values insert a minus (-) before the value. For frequencies below 15 GHz, the power shall be averaged over the worst 4 kHz band; for frequencies 15 GHz and above, the power shall be averaged over the worst 1 MHz band. The worst 4 kHz or 1 MHz bands are defined as those having the highest power density within the assigned emission bandwidth.

Example: 321. 8

TRANSMITTER EQUIPMENT

When both fixed and mobile stations (FA/MA,FB/ML, etc.) are used, enter the fixed transmitter data.

340 Equipment Nomenclature. (1,18)(M) Enter equipment code followed by equipment component or system nomenclature for the transmitter location. Separate multiple entries with a slant bar. (Data Items 340 and 343 are interrelated and each entry in Data Item 340 should be accompanied by a corresponding entry in Data Item 343, if known.)

a. Enter one of the following equipment type codes:

G- government nomenclature

- C- commercial model number
 U- unassigned nomenclature

b. After the equipment type code, enter a comma and then the nomenclature subject to the following:

- (1) For government equipment nomenclature, enter the standard military nomenclature.

Examples: 340. G,AN/GRC-103
 340. G,AN/MRC-110/G,AN/MRC-117
 340. G,T128

- (2) If only a commercial model number is available, indicate the manufacturer of the equipment using the manufacturer's code listed in Annex G of the NTIA Manual, followed by the model number. If no manufacturer code exists, enter the full name of the manufacture in Item 801.

Example: 340. C,MOTH23FFN1130E

- (3) If the nomenclature includes a modification, insert MOD and a number, if applicable, immediately following the nomenclature. For the word MARK, insert MK immediately following the nomenclature.

Example: 340. G,T238MK1

- (4) If the transmitter does not have an assigned government nomenclature or commercial model number, enter the manufacturer's name and a brief description of the equipment listed in Data Item 801.

Example: 801. COLLINS RADIO EXPERIMENTAL
 801. RADAR

341 Number of Equipment, System Name. (5, 18)(S) This is a two-element field. The first element (a) identifies the number of mobile and/or transportable equipment at a station (transmitting and receiving) operating in the listed fixed and mobile bands. The second element (B) contains the system name. A station is one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service. A system is two or more stations that have a common property, usually geographic, administrative, functional, or operational in nature. In the bands 30-50, 138-144, 148-149.9, 150.05-150.8, 162-174, and 406.1-420 MHz, enter the number of land mobile stations, ship stations, and transportable stations associated with the assignment (if desired this data may be entered on assignments in other bands or for aircraft stations). The number entered shall represent either the exact number of equipments or a range of numbers as follows:

Number of Equipments	Enter
1-10	10
11-30	30
31-100	100

101-300	300
301-1000	1000
1001-3000	3000
3001-10000	10000
Above 10000	nearest 10000

If the exact number is to be recorded, and it is 10, 30, 100, 300, 100, 3000, or a multiple of 10,000, add one to the number to distinguish it from a figure that represents a range of numbers. System names shall be determined by the applicant and must not be longer than 18 characters. The word NET may be used as the system name.

Example: 341. 21,NET

Also, you may enter N if the assignment represents an entire system; enter S for all other cases.

Examples: 341. 31.N
341. XXXXX,S

343 Equipment Allocation Status. (&)(M) Enter the equipment's J-12 allocation number (DD form 1494) if known. (Data Items 340 and 343 are interrelated and each entry in * Data Item 343 must be accompanied by a corresponding entry in Data Item 340.)

Examples: 343. 1269
343. 0337/2
343. 0123/0209

345 Radar Tunability. (2)(M) For all radars, enter one of the following symbols:

- FA - frequency agile radars that operate on various frequencies within a and, either in a specified or random mode.
- FV - radars that operate on a discrete frequency determined by the characteristics of a fixed magnetron or similar radio frequency generating device.
- FX - radars capable of operating on a single discrete frequency
- TC - radars capable of being tuned to any frequency within the requested band
- TS - radars capable of being tuned across the authorized or requested band in discrete steps or increments; includes crystal control.

Examples: 345. TC
345. FX

346 Pulse Duration. (9 or 9-9)(M) For all stations using pulsed emissions, insert a numeric value(s) indicating the characteristic pulse duration(s) (PD) of the equipment at the half-power points. PD will be indicated in microseconds up to and including 999 microseconds and in milliseconds at one millisecond and above, adding the letter M at the end of the numeric value when expressed in milliseconds. Fractions may be shown to the nearest tenth by using a decimal. For equipment having a capability for more than one discrete PD, insert the appropriate numerical values separated with a slant bar delimiter (/). For equipment having a capability for continuously variable PDs over wide range(s), insert upper and lower numerical values separated by a dash.

Examples: 346. 2M/6M
346. 1/3/5
346. 1M-25M/27M-50M

347 Pulse Repetition Rate. (9 or 9-9)(M) For all stations using pulsed emissions, enter the numeric value(s) for the pulse repetition rate(s) (PRR) of the equipment. PRR will be indicated in pulses per second (PPS) up to and including 999 PPS and in thousands of pulses per second at 1000 PPS and above, adding the letter K after the numeric value. For equipment operating on more than one discrete PRR, insert the appropriate numerical values separated with a slant bar delimiter (/). For equipment having a capability for continuously variable PRRs over wide range(s), insert upper and lower numerical values separated by a dash.

Examples: 347.500/750/1K
347. 200-600

TRANSMITTER ANTENNA DATA

When both fixed and mobile stations (FA/MA,FC/MS, etc.) are used, enter the fixed antenna data. If multiple antennas are used separately, enter data for the antenna used most frequently.

NOTE 1: Items may be omitted for terrestrial stations operating at 29,890 kHz and above if for:

TRANSMITTER ANTENNA DATA

- a. Experimental stations
- b. Mobile stations

354 Antenna Name. (10)(S) Enter the name (type) of the antenna. Entry not required if application is:

- a. Below 29,890 kHz
- b. Space or Earth Station
- c. See NOTE 1 above

Examples: 354. WHIP
354. PARABOLIC

355 Antenna Nomenclature. (18)(S) Indicate antenna's military nomenclature or commercial manufacturer's model number. Omit if antenna is part of a satellite transponder.

Example: 355. AS102

357 Antenna Gain. (4)(M) Enter the antenna gain (in dB with reference to an isotropic source) in the direction of maximum radiation. Gain may be omitted on applications for terrestrial stations at:

- a. Below 29,890 kHz if for other than fixed (FX) and aeronautical fixed (AX) stations in the 3000 to 29,890 kHz band.

- b. See NOTE 1 above.

For a space station, the gain of up to three antennas may be shown with the respective gains separated by a slant bar. For a negative gain (earth and space stations only), enter a dash before the value of gain.

Examples: 357. 10
357. 20/18/30

358 Antenna Elevation. (5)(S) Enter the site (terrain) elevation in feet above mean sea level (MSL). Entry not required if application is:

- a. For frequencies below 29,890 kHz
- b. For terrestrial stations operating at 29,890 kHz and above if for (1) experimental stations, and (2) mobile stations.

Example: 358. 980

359 Antenna Feed Point Height. (5)(S) Enter the antenna "feed point" height in feet above surrounding terrain. Entry not required if application is:

- a. For frequencies below 29,890 kHz.
- b. See NOTE 1 above

Example: 359. 10

360 Antenna Beamwidth. (4)(M) For space, earth, or terrestrial stations (including experimental) employing space or earth station techniques, enter the antenna beamwidth (degrees) at the half power points. For a fractional beamwidth, prefix the decimal with a zero. For a space station, the beamwidth of up to three antennas may be shown with the respective beamwidths separated by a slant bar.

Examples: 360 05
360. 12/20/30
360. 17.2

362 Antenna Orientation. (3,7)(M)

- a. Terrestrial Antenna: Enter the three digit azimuth in degrees from true north or one of the codes listed below for the transmitter antenna.

Antenna Codes

ND	=	nondirectional
R	=	rotating through 360
S	=	fixed direction but steerable in the horizontal plane
SSH	=	scanning horizontally through a limited sector

SSV = vertical scanning (nodding)
 T = tracking that can observe a moving object.

Examples: 362. 225
 362. ND

b. Earth Station. Enter the antenna's minimum operating elevation in degrees consisting of V followed by a two-digit value. Follow the vertical data with a comma and the azimuth in degrees from true north to the geostationary satellite. For two nongeostationary satellites, enter the azimuth to each separated by a slant bar. For more than two nongeostationary satellites, enter the maximum range of the azimuth angle separated by a dash. If the earth station must communicate with more than one geostationary satellite, create an additional record.

Examples: 362. V09,133
 362. V10,032/050
 362. V12,122-160

c. Space Station: Enter either NB for narrow beam or EC for earth coverage.

Example: 362. EC

363 Antenna Polarization. (1)(M) Enter the polarization of the antenna using the following symbols:

Code	Polarization
D	Rotating
E	Elliptical
F	45-degree
H	Fixed horizontal
J	Linear
L	Left-hand circular
R	Right-hand circular
S	Horizontal and vertical
T	Right and left circular
V	Fixed vertical
X	Other or unknown

Example: 363.V

For space station, polarization may be listed for up to three antennas:

Example: 363. F/J/L

RECEIVER LOCATION DATA

When multiple occurrences of receiver location data occur, the data entries must correspond in the same sequence throughout; that is, proper alignment of multiple occurrences entries must be

maintained so each specified data item will be associated with the correct receiver. Additionally, each set of equipment and antenna data must associate with a particular occurrence of a receiver location site. When more than one receiver location is involved, the corresponding information in the data items will be designated as R01 or R02, etc.,. For example, 401. TAMPA,R01 MIAMI,R02 indicates that receiver number one is in Tampa and receiver number two is in Miami.

400 State/Country. (4)(M) Enter the name or abbreviation of the state, country, or area in which the receiving antenna is located.

401 Antenna Location. (24)(M) Enter the name of the actual location of the receiver antenna. Military installations are considered to be a city or other geographical subdivision. In certain cases nongeographical data is used; e.g., MOON, MISSILE, AIRCRAFT, SHIPS, GEOSTATIONARY or NONGEOSTATIONARY. For mobile or transportable applications, see Data Items 406, 530, and 531. This entry will be abbreviated if:

- a. The location is the same as that entered in Data Item 400.
- b. The location contains one of the following words:

Location Word	Abbreviation
Camp	CP
District	DI
Division	DV
Fort	FT
Mount	MT
Mountain	MTN
Proving Grounds	PG
Saint	ST

- c. The location name exceeds 24 characters are applying b above. If an entry has been used in other assignment records, use the same one. If not previously used, then shorten entry to 24 characters and enter the full name in Data Item 801 for review by the assignment authority.

Examples: 401. NASHVILLE
401. NONGEOSTATIONARY

403 Antenna Co-ordinates. (15)(M) Enter geographical co-ordinates (degrees, minutes, and seconds) for the antenna location. If station is abroad a nongeostationary satellite, leave both latitude and longitude blank. If the seconds are not known, insert XX for the seconds, except in the case of the NAVAIDS, geostationary satellites, and microwave facilities. Use leading zeros as appropriate for degrees, minutes or seconds. Degrees latitude require two digits; degrees longitude require three digits. Leave the data item blank if the site named in receiver Antenna Location (Data Item 401) is an area for which co-ordinates cannot be applied. Enter N or S for latitude and E or W for longitude.

Examples: 403. 422615N1263228W
403. 000000N0925300W

404 Call Sign. (6)(M) This data item is for the international call sign assigned to the receiving station. Leave blank if it is either a local voice or tactical call sign, or if it is not applicable. For navigational aids, this data item is used for the identifier instead of a call sign.

Example: 404. WUH55

406 Authorised Mileage Radios. (4)(M) If Data Item 306 is blank, enter the radius (in statute miles from the co-ordinates entered in Data Item 403) to describe the area in which the receiver station will operate (Note: When both fixed and mobile stations transmit) on the same frequency, an entry in this data item indicates that the mobile station will be operating within the area described).

Example: 406. 250

407 Path Length. (5)(M) *** This is a computer-generated output data item. It is the distance between the transmitter and receiver(s) expressed in kilometres for terrestrial stations in the fixed service between 4 and 30 MHz.

408 Repeater Indicator. (1)(M) Applicable only between 29,890 and 420 MHz. Enter the letter R for each receiver location when a station in the fixed or mobile service is used primarily as a repeater.

Example: 408. R,R01

SPACE STATIONS

Data Items 414 through 419 are to be used for unique space station data. Leave Data Items 415 through 419 blank for geostationary satellites.

414 SDC Object Number. (5)(M) If known, enter the Space Defense Center (SDC) object number as listed in the SDC catalogue.

415 Equatorial Inclination Angle. (4)(M) Enter equatorial inclination angle (degrees).

416 Apogee. (5)(M) Enter Apogee (statute miles).

417 Perigee. (5)(M) Enter Perigee (statute miles).

418 Period of Orbit. (7)(M) Enter period of orbit. If it is less than 24 hours, enter time in hours followed by the letter H. If it is 24 hours or more, enter the number of days followed by the letter D.

419 Number of Satellites. (2)(M) Enter the number of nongeostationary satellites in the system.

RECEIVER EQUIPMENT

When both fixed and mobile stations (FA/MA, FC.MS, etc) are used, enter the fixed receiver data.

440 Equipment Nomenclature. (1,18)(M) Enter equipment code followed by equipment component or system nomenclature for the receiver location. Separate multiple entries with a slant bar.

a. Enter one of the following equipment codes:

G	-	government nomenclature
C	-	commercial model number
U	-	unassigned nomenclature

b. After the equipment type code, enter a comma and then the nomenclature subject to the following:

(1) For government equipment nomenclatures, enter the standard military nomenclature.

(2) If only a commercial model number is available, indicate the manufacturer of the equipment using the manufacturer's codes listed in Annex G of the NTIA Manual, followed by the model number. If no manufacturer code exists, enter the full name of the manufacture in Data Item 801.

(4) If the receiver does not have an assigned government nomenclature or commercial model number, enter the manufacturer's name and a brief description of the equipment in Data Item 801.Angle (degrees)(4)(M).

443 Equipment. (7)(M) * Enter the equipment's J-12 allocation number Allocation Status (DD Form 1494) if known. (Data Items 440 and 443 are interrelated and each entry in Data Item 443 must be accompanied by a corresponding entry in Data Item 440.)

Examples: 443. 1269
443. 0377/2

RECEIVER ANTENNA DATA

Receiver antenna data is required for space and earth station, fixed (point-to-point) and fixed station receiver or repeaters to which a mobile station transmits. (In other instances, data entry is possible.) If multiple antennas are used separately at a receiver site, enter the data for the antenna used most frequently.

NOTE 2: Data Items may be omitted for terrestrial stations operating at 29,890 kHz and above for.

a. Experimental stations.

b. Mobile stations.

454 Antenna Name. (10)(M) Enter the name (type) of the antenna. (See NOTE 2 above).

455 Antenna Nomenclature. (18)(M) Indicate antenna's military nomenclature or commercial manufacturer's model number. Omit if antenna is part of a satellite transponder.

457 Antenna Gain. (4)(M) Enter the antenna gain (in dB with reference to an isotropic source) in the direction of maximum radiation (See NOTE 2 above). Gain is also required for fixed (FX) and aeronautical fixed (AX) stations in the 3000 to 29,890 kHz band. For a space station, the gain of up to three antennas may be shown with the respective gains separated by a slant bar. For a negative gain (earth and space station only) enter a dash before the value of gain.

Example: 457. 27,RO1 27/53,RO2

458 Antenna Elevation. (5)(M) Enter the site (terrain) elevation in feet above mean sea level (MSL). (See NOTE 2 above).

459 Antenna Feed Point Height. (5)(M) Enter the antenna "feed point" height in feet above surrounding terrain. Entry not required if application is:

- a. For frequencies below 29,890 kHz
- b. See NOTE 2 above.

460 Antenna Beamwidth. (4)(M) Enter the antenna beamwidth (degrees) at the half power points. For a fractional beamwidth, prefix the decimal with a zero. For a space station, the beamwidth of up to three antennas may be shown with the respective beamwidths operated by a slant bar. (See NOTE 2 above).

462 Antenna Orientation. (3,7)(M)

- a. Terrestrial Antenna: (See NOTE 2 above). Enter the azimuth in degrees from true north or one of the codes listed below for the receiving antenna:

Antenna Codes

ND	=	nondirectional
R	=	rotating through 360
S	=	fixed direction but steerable in the horizontal plane
SSH	=	scanning horizontally through a limited sector
SSV	=	vertical scanning (nodding)
T	=	tracking that can observe a moving object.

Examples: 462. 225
462. ND

- b. Earth Station. Enter the antenna's minimum operating elevation in degrees consisting of V followed by a two-digit value. Follow the vertical data with a comma and the azimuth in degrees from true north to the geostationary satellite. For two nongeostationary satellites, enter the azimuth to each separated by a slant bar. For more than two nongeostationary satellites, enter the maximum range of the azimuth angle separated by a dash. If the earth station must communicate with more than one geostationary satellite, create an additional record.

Examples: 462. V09,133
462. V10,132/150

462. V12,122-160

c. Space Station: Enter either NB for narrow beam or EC for earth coverage.

Example: 462. EC

463 Antenna Polarization. (1)(M) (See NOTE 2 above). Enter polarization of the antenna using the following symbols:

Code	Polarization
D	Rotating
E	Elliptical
F	45-degree
H	Fixed horizontal
J	Linear
L	Left-hand circular
R	Right-hand circular
S	Horizontal and vertical
T	Right and left circular
V	Fixed vertical
X	Other or unknown

For a space station, polarization may be listed for up to three antennas.

SPACE SYSTEMS

Data Items 470 through 499 are to be used for unique space system data.

470 Space Station Receiving Noise Temperature. (5)(M) Enter the space receiving station noise temperature in degrees Kelvin. If more than one receiver antenna was reported, enter a value for each antenna, separated by a slant bar.

Example: 470. 200/300/150

When multiple receiving space stations are reported, follow the noise temperature data with the number of the associated receiver location.

Example: 470. 200/300/150,RO2

471 Earth Station Receiving System Noise Temperature. (5)(M) Enter the earth receiving system noise in degrees Kelvin.

Example: 471. 60

When multiple receiving earth stations are reported, enter the noise temperature for each earth station followed by the number of the associated receiver location.

Example: 471. 60,RO1 100,RO2

472 Equivalent Satellite Link Noise Temperature. (5)(M) This entry is required for each receiving earth station that receives signals from a space station involving a frequency-changing transponder. All satellite links that involve a receiving earth station must be considered in determining the lowest equivalent satellite link noise. Enter noise temperature in degrees Kelvin, taking into consideration all satellite links received by the earth station on the frequency indicated.

Example: 472.96

SUPPLEMENTARY DETAILS

These data items are for data not specifically covered elsewhere.

500 IRAC Notes. (4) (M) *-* For US&P Only. Enter IRAC note numbers separated by a slant bar. Enter M-notes with details in Data Item 501.

Example: 500. S362

501 Notes Free-Text Comments. (35)(M) ** This data item identifies M-notes, including amplifying data associated with each note. For each M-note, include up to 35 characters by entering the M-note, a comma, and the associated amplifying text. Do not enter more than one M-note per data line.

Examples:

501. M005.ROCKVILLE,MD

501. M003,WRCTV,WASHINGTON,DC/JOHN SMITH

501. M003,(202)841-5121

502 Description of Requirement (1440) (S) This data is not sent to IRAC. Give a general description of the requirement, indicating specific use of the frequency(ies) or band(s). Include other remarks as appropriate and the reason for modification/deletion of any of that particulars of the assignment. Do not duplicate data entered in Data Items 503, 520, or 705.

503 Agency Free-Text Comments. (35)(M) *-* This data item is used to record agency remarks in the application processed through IRAC. Enter up to 35 characters per line and precede each line with the item number. Remarks not intended for the IRAC should be entered in Data Item 502.

Example: 503. CLASSIFIED ITEMS DETERMINED IAW

503. PATRIOT SCG, DATED 22 SEP 83

504 FAS Agenda or OUS&P Code Number. (72)(M) *-* This data item is used whenever it is comments necessary to provide information that is not required to be recorded in the GMF or FRRS. The data will appear in the FAS Agenda (ACTF) file and the FRRS Temp files only. It will not appear in the GMF or FRRS master files. A maximum of five occurrences is permitted.

Examples: 504. FIVE YEAR REVIEW UPDATE

520 Supplementary Details. (1200) (S) *-* This is a free-text data item. It includes the following information, as appropriate, plus any additional amplifying information that would facilitate IRAC's authorization of this transaction.

- a. Doppler shift, if a significant factor in the particular system.
- b. General description of the assignment requirement.
- c. Sounder justification.
- d. For US&P records refer to NTIA Manual, Chapter 9, for further details.

Enter as many data lines as necessary to give a general description of the requirement, indicating specific use of the frequency(ies) or band(s).

Example: 520. COORDINATED WITH AF AND NAVY.

530 Authorized Areas. (3,35)(M) This data item is used to describe areas that cannot be described under Authorized Mileage Radius (Data Item 306) or Authorized States (Data Item 531). If the antenna location in Data Item(s) 301 and/or 401 is the name of a state/country or USA, a part of a state/country or parts of several contiguous states/countries may be entered here (for a particular transmitter or receiver location, do not enter data here if Data Item 531 is used). The following identifying codes are available:

- ART - for transmitting in area shown
- ARR - for receiving in area shown
- ARB - for transmitting and receiving in area shown

For each entry, enter the identifying code followed by a comma and the data concerning the area, using state/country abbreviations as shown in ANNEX G of the NTIA Manual. Use the letter N for north, S for south, E for East, and W for west when describing areas by latitude and longitudes. Separate elements by a comma.

Examples: 530. ART,SW WY,NE UT,NW CO
 530. ARR,S OF 33N
 530. ARB,39N43N098W099W
 530. ART,S OF 40N, E OF 095W

531 Authorized States. (3,4,4,...,4) (M) US&P Only. This data item is used to include or exclude states whenever the transmitter and/or receiver antenna location is specified as an area of operation within several states. If the antenna location in Data Item(s) 301 and/or 401 is specified as US, USA, or USP for an area of operation within several states, enter the states to be included or excluded (for a particular transmitter or receiver location, do not enter data here if Data Item 530 is used). The following identifying codes are available.

- ESB - for transmitting and receiving in all states except those listed
- ESR - for receiving in all states except those listed
- EST - for transmitting in all states except those listed
- LSB - for transmitting and receiving in the states listed

LSR - for receiving in the states listed
LST - for transmitting in the states listed

Precede each line with one of the above identifying codes and a comma. Separate entries with commas as shown in the example. Use state abbreviations as shown in Annex G of the NTIA Manual.

Example: 531. LST, CA,OR,WA

OTHER ASSIGNMENT IDENTIFIERS

As required

701 Frequency Action Officer. (3) (S) ** Enter the identification of the person or group responsible for the assignment. Not to be used if Data Item 010 equals A. Required for Air Force, optional for all others.

Examples: 701. LFC
701. 322
701. T04

702 Control/Request Number. (15)(S) Enter organizational control number as directed by the responsible agency or CINC. This data item permits subordinate organizations to track proposals. For Air Force CONUS MAJCOMs use the 3-letter MAJCOM symbol followed by the 2-digit year and the annual sequential number.

Example: 702. TAC 81-007

For Army Organizations in CONUS Reporting to the Army C-E Services Office use the 2-letter code for AFC or command, followed by the last digit of the current year and sequential 4-digit annual number. Use leading zeros as needed.

Examples: 702. A581011

For Navy Organisations enter control/request number.

Example: 702. N-431-88

For Europe use EUCOM Control Number. Use leading zeros as needed.

Example: 702. USAREURS1-266

704 Type of Service. (1)(S) For USCINCEUR Units enter the type of circuit code from the following list.

S - simplex
D - duplex
H - semiduplex
Z - simplex net
T - one directional transmission

B	-	broadcast
M	-	simultaneous broadcast
N	-	radionavigation
L	-	radiolocation
R	-	reception only
X	-	radio-determination

Example: 704. N

705 System Identifier. (35)(S) Required for IRAC assignments using frequency bands 29.89050.0,162.0-174.0, or 406.1 -420.0 MHz if the assignment does not contain IRAC note S322 in Data Item 500. Entry is optional for all other assignments. If the assignment will be used for more than one purpose or function, enter the one that is most important. If two or more are equally important, choose the one that will be used most often and enter the other(s) as amplifying data. Enter one of the system identifiers as listed below followed by a comma and additional amplifying information, if necessary.

Total length, including spaces, must not exceed 35 characters. Use in other frequency bands is optional, but must comply with listed identifiers.

Function or Purpose

Adminisitrative
 Air Traffic Control
 Backbone
 Commander
 Construction
 Contingency
 Executive
 Fire
 Hydrologic
 Inspection
 Law Enforcement
 Maintenance
 Medical
 Mise
 Mobile Telephone
 Natural Resources
 NAVAIDS
 Nav aids Controls
 Paging
 RDTE Support
 Seismic
 SMR
 Special Courier
 Survey
 Telecommand
 Test Range
 Training
 Transportation

Trunking
Utilities
Weather
Wireless Mike

Examples: 705. FIRE
705. TRANSPORTATION,TAXI DISPATCH
705. CONSTRUCTION,MAINTENANCE

707 USCINCPAC Complement Number. (8)(M) Enter the number used to identify a family grouping of frequencies that have a like or similar use.

Examples: 707. 341-00
707. 796-03

710 Host Country Docket Number. (12)(M) Enter the docket/case number assigned by the soil (host) country to the frequency authorization.

Example: 710. f84-171

711 Aeronautical Service Ramp and Height. (6)(S) Provide flight level and service range of all aeronautical navigational aids and air traffic control and assignments for frequencies above 29,890 kHz and low-frequency beacons. Service range is optional when authorized radius has been provided in Data Item 406. Enter service range (in miles) using three digits followed by flight level (in hundreds of feet) using three digits. The first example indicates a 250-mile range at 8500 feet; the second example indicates an 8500 ft range in Item 406.

Examples: 711. 250085
711. 085

714 ARFA Function Number. (3)(M) the functional number used by the Allied Radio Frequency Agency (ARFA) to specify the operational use of all frequencies in the 100-156, 225-400, and 960-1215 MHz bands. See ARFA Basic Notification Forms (ABNF) handbook for codes.

Example: 714. 100

715 Transmitter ARFA MRFL Number. (6)(S) Enter the transmitter ARFA MRFL serial number of the frequency assignment in this message as recorded in the ARFA MRFL.

Example: 715. 821234

716 Usage Code. (1)(S) Required for USCINCEUR, optional for all others. Enter one of the following codes.

1 = wartime circuits required to be operated or to be ready for operation in peacetime (terminals fully equipped with appropriate installation and personnel).

2 = wartime circuits that have a limited capability in peacetime for exchanging traffic between the planned terminals (equipment and personnel shared with other "2" circuits).

- 3 = required for wartime only (equipment is, or will be, available).
- 4 = required for occasional and temporary usage for training exercises or maneuver purposes, and for peacetime emergencies when a category of the above circuits cannot be used or does not exist to meet such occasional needs.
- 5 = required for the deployment phase of contingency operations.
- 6 = required for the employment phase of contingency operations.
- 7 = required for peacetime only
- 8 = other. Provide explanation (Proposals only)
- Example: 716.3

ADDITIONAL INFORMATION

This category of data will not be stored in the record.

801 Co-ordination Data/Remarks. (6)(M) List agencies with whom co-ordination has been effected (e.g., FAA, GAFC, etc) and include any remarks that may be appropriate for processing the assignment.

Example: 801. GAFC 021200Z AUG 82

803 Requestor Data. (60)(S) Provide name and phone number of individual submitting request.

804 Tuning Range/Tuning Increments. (60)(M) (Required for USCINCEUR, optional for all others). Enter the tuning range of the equipment. Enter units followed by lower-and upper-frequency list of the equipment. Separate frequencies with a dash. This data is stored in the data base and is output for USCINCEUR assignments. Also enter one of the following to indicate the largest tuning increment of the frequency(ies) listed in Data item 110. Separate entries with a comma.

TUNING INCREMENTS

Continuously tunable

100 kHz

50 kHz

25 kHz

12.5 kHz

20 kHz

500 kHz

250 kHz

200 kHz

125 kHz

75 kHz

10 kHz

5 kHz
1 kHz
500 Hz (.5 kHz)
100 Hz (.1 kHz)
10 Hz
1 MHz (1000 kHz)
Crystal (not tunable)
Other (explain with text)

Example: 804. M250-300, 100 KHZ

805 Data Response Required. (6)(S) Required only on frequency proposals to be processed within the European theater. Enter the date by which either an assignment or non-assignment of requested frequencies is required to provide notifications to potential users. Except in unusual circumstances, this date should be at least 65 days from the date the message release or initial request date. List the date as YYMMDD.

Example: 805. 820315

806 Indication if Host Nominations are Acceptable. (6)(M) Required for USCINCEUR, optional for all others. Enter YES followed by a statement indicating band limitations and (Text) channelization requirements if host nation nominations are acceptable to fulfil the requirement. Enter NO followed by the reason why if other nominated frequencies cannot be used.

Example: 806. YES, BAND LIMITATIONS ARE.....

807 Frequencies to be Deleted. (60)(M) Required only on frequency proposals to be processed within the European theater. List (Text) the frequencies that can be deleted upon assignment of the requested frequencies along with USCINCEUR Frequency Management Field Office Brussels, Belgium and/or FRG case numbers and MRFL numbers when available. Leave blank if no frequencies will be deleted.

Example: 807. K14.5,USAREUR-81-266,F61-836,131101

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